

**The 2005  
Enterprise Architecture,  
Process Modeling &  
Simulation Tools Report**

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## Foreword

This is one in a series of reports that BPTrends publishes on business process software products. We produce these reports to provide our members with an overview of the various types of business process software products available today. In each report we define the specific market, describe the features important in tools designed for that market, provide detailed reviews of the leading players and their products, and provide a comparison of the key features of the products.

Figure 1 provides an overview of the business process software products market as BPTrends currently defines it. We use circles to represent the major product groupings and have overlapped circles to suggest key relationships. The olive area in the center of Figure 1 represents the product groupings we focus on in this report.

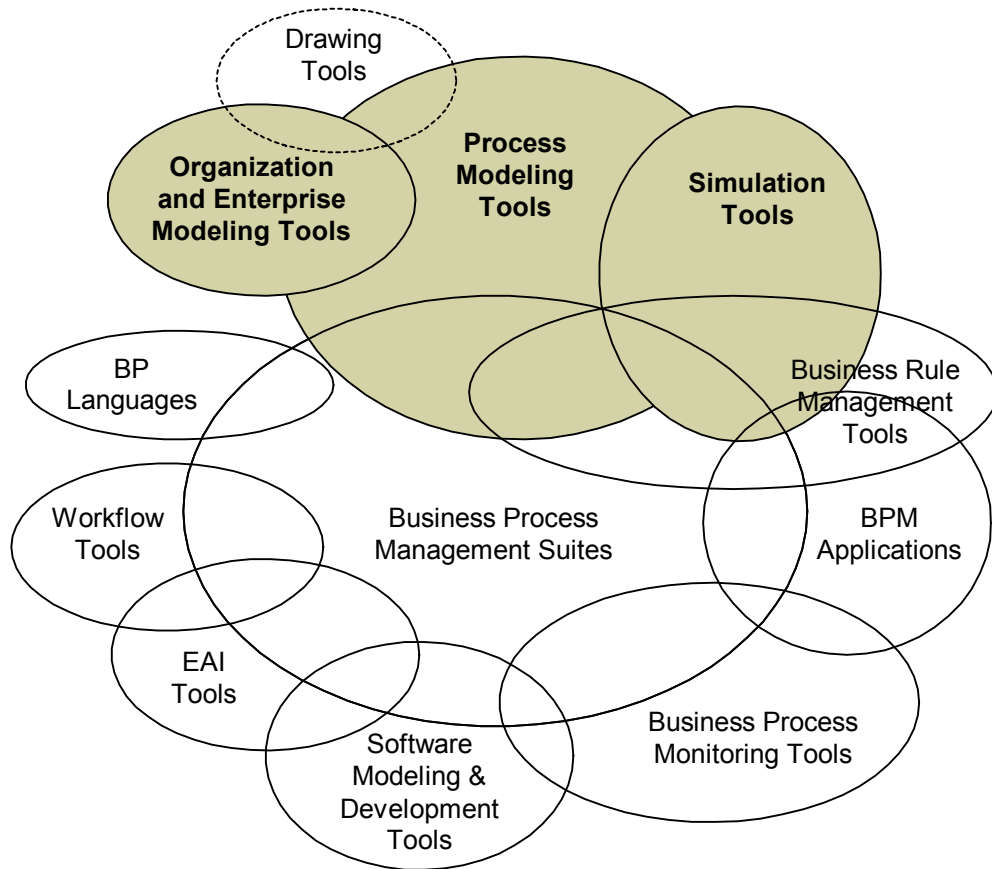


Figure 1. The Business Modeling Software Product Market.

### What Are Enterprise Architecture, Process Modeling, and Simulation Tools?

This report focuses on tools that companies use to analyze and modify business processes. The core tool for this task is a tool that lets business managers or analysts create a diagram or model of a business process and then change that diagram to explore how the process could be improved or redesigned. Some business process change teams prefer process modeling tools that are simple and easy to use. Others prefer more sophisticated tools that can support additional tasks. Many organizations use the same process modeling tool to analyze many different processes. Some create diagrams of entire value chains and then subdivide the chain into separate processes and subprocesses to understand how everything works together. Similarly, many companies analyze their

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organizations as a whole to define how all the processes or value chains work together. At the same time they extend the process models to show how resources flow into the processes and how employees and software systems support processes. Others use their process modeling tools to gather cost data on processes. Some use process simulation tools to explore how a process will function before they make physical changes in actual processes.

Tools that provide support for organization analysis and modeling are, today, usually termed Enterprise Architecture tools. Tools that focus entirely on simulation are termed Simulation Tools. Increasingly, however, companies are using business process modeling tools that also incorporate support for enterprise modeling and simulation. Thus, we decided to include all the tools that can be used for Enterprise Architecture, Business Process Modeling, and Process Simulation in the same report.

To simplify the language of the report, we will use the term *modeling tool* as a generic phrase whenever we want to refer all the tools being considered in this report. We will use the terms *enterprise architecture tool*, *process modeling tool*, or *process simulation tool* only when we wish to refer to tools that provide these specific functions.

We have consciously excluded three other types of tools from this report. We do not consider the simpler graphical drawing or diagramming tools. These tools are widely used for creating simple process diagrams, but they cannot support sustained modeling and redesign efforts. The key to discriminating between the drawing tools and serious process modeling tools is whether they store data about the models in a database or repository. Serious modeling tools create data entries in a database. Thus, a box drawn in a process modeling tool is not simply an image of a box; it is an object in a database. Once you give the box a name you can begin to record information about that process or activity. You can record costs and associated business rules. You can indicate where inputs come from and where outputs go, and you can name the software applications that support that activity. More important, you can create a new diagram and create a new box with the same name and immediately inherit all the data you have already entered to describe that activity. In other words, a serious process modeling tool is the interface for a database that allows you to organize and save information about your business processes. All of the process modeling tools considered in this report store data about processes and can be used to create and manage a database of information about your organization's processes.

Second, we do not consider either BPM Suites or Software Modeling Tools in this report. The BPM Suites are considered in a separate report, **The BPTrends BPM Suites Report**, which is currently posted on the BPTrends website. BPM Suites include process modeling tools, but they are primarily used to manage the day-to-day execution of business processes. They also provide other capabilities used by those managing processes, including business rule execution engines and real-time process monitoring. Similarly, we have not included the various Software Modeling Tools in this report. Those tools are used by software developers to capture business requirements and to design software applications. A glance at marketing data reveals that vendors in the Process Modeling, BPM Suites, and Software Modeling markets are not competing with each other. In essence, there are three separate market niches. The leading Process Modeling vendors are all flourishing and Process Modeling tools are being used by business managers and analysts who want to create or improve their business processes.

Our objective in this report is to describe the various options available from Enterprise Architecture, Process Modeling, and Process Simulation vendors. Different companies are using these tools for very different purposes. It does not make sense to argue that there is, or should be, a "best" tool with a specific configuration that would be best for all. Thus, we have avoided any comparison that suggests that some tools are the "winners" while others are "less desirable." Instead, we analyze each product, explain what specific markets the vendor is pursuing, consider how the tool is adapted for that market, and identify what is special or unique about each product.



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To make comparisons as easy as possible, we have explored the capabilities of modeling tools in several ways. These are discussed in the section entitled, "A Detailed Analysis of Enterprise, Process Modeling and Simulation Tools." Some vendors only implement a subset of the features we describe. That does not necessarily detract from their offering. It could mean that the vendor does not think the feature is required for its target market. Or it could mean that the vendor thinks it is more efficient to partner with another vendor who provides that specific feature. For example, we asked each vendor how it supports simulation. Some have built their own simulation engine into their tool. Others provide links to another simulation tool developed by a third party. Still others do not provide a simulation engine, allowing users to select their own. No one of these solutions makes the underlying Process Modeling tool better or worse, although it may make it more or less popular with a particular user. Users that already have a simulation tool may prefer a business modeling product without an embedded simulation system. Users at companies that do not currently have a standard simulation tool may prefer a modeling tool with its own simulation engine. As we said, it is impossible to say exactly what the ideal business modeling tool should have or not have. We have sought to provide a simple, clean description of the current features available in each product in this report.

### **Participating Vendors**

BPTrends contacted all the Enterprise Architecture, Process Modeling, and Simulation tool vendors we could identify and solicited their participation in this report at a cost of \$5,000. All products from participating vendors were evaluated in the same manner: Curt Hall and Paul Harmon prepared a detailed questionnaire that each vendor was asked to complete. They reviewed the questionnaires, studied the product documentation and any other relevant materials provided by the vendors, and then requested a product demonstration. Finally, they interviewed each vendor to eliminate any confusion and to make certain they had not overlooked anything. They did not conduct any actual product testing.

We intend to maintain and expand this report in the future. Any vendors who would like to be included in future versions of this report should contact me directly.

### **Thanks to Our Coauthors and Members**

I want to thank our friend and colleague, Curtis Hall, for his contribution as the principal analyst and author of this report. Curt's knowledge and experience as an editor and analyst proved invaluable in researching and writing this Report. I also wish to thank my longtime friend and business partner, Paul Harmon, for bringing his vision, knowledge, and perspectives on the business process performance market to bear on this report. Finally, I want to thank all our BPTrends members and readers who continue to support us. We hope this report is informative and useful to all of you, and we look forward to hearing your comments and suggestions.

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## Introduction

### 1. Why the Current Interest in Business Processes?

The press and various analyst groups have spent the last 3 to 4 years discussing the renewed interest in business process change. Business managers, of course, have been interested in business process change for decades, but their interest and those of the press and analysts tend to grow with new innovations and wane when conditions conspire to focus their attention elsewhere. Over the last decade we have witnessed successive waves of interest in Quality Control and Six Sigma, in Business Process Reengineering, in Workflow and Packaged Software Applications, in Balanced Scorecard, and, more recently in Business Process Management software systems (BPM Suites) designed to control the execution of actual applications. And, while all of these initiatives have been explored, organizations have continued to change business processes by automating more and more aspects of the business. Today, Internet and the Web implementations are driving process changes throughout most organizations.

Throughout the entire decade, while the specific initiatives we just described have waxed and waned, companies have continued to work to understand their business processes and to improve them. To help with this effort, most large companies have employed business process modeling tools. Thus, unlike many of the recent BPM Suite vendors, most of the business process modeling vendors have been in existence for several years. In a sense, the process modeling market is more mature than the BPM Suites market. In another sense, however, it is still developing. The recent emphasis on aligning processes and activities with IT resources to track the achievement of objectives and to determine the process specific costs, for example, has led to a number of developments that have resulted in the emphasis on Enterprise Alignment and simulation. Similarly, the development of the Internet and Web has changed the nature of many businesses and has led to major changes in how software applications are deployed to support business processes. Thus, today's business process modeling tools market is very dynamic, with all the vendors scrambling to add new features and support for newly evolving standards to their products. .

In a similar way, companies are reevaluating their business process management practices and exploring new, more comprehensive ways to employ process modeling tools. Thus, it is too early to offer a rigid definition of what a business process modeling tool should be or to propose a way of evaluating which business process modeling tool is best. Companies doing Six Sigma work may prefer one type of process modeling tool, while companies redesigning processes for automation may prefer another. Likewise, those using process modeling tools to document enterprise architectures will have still their own particular requirements. Predictably, most business process modeling tools will be considerably different in 12 or 18 months.

### 2. An Overview of Business Modeling Tools

Business Modeling Tools, as we use the term in this report, are software products that are used by business managers, analysts, or developers to create models of business organizations, to analyze models, and to save information about models.

Business Modeling Tools serve three primary functions. First, they document an existing situation. Second, they assist in analyzing the effects of possible changes. Third, they document plans to change the existing situation in some way. As a result they provide the ability to create various types of diagrams. Diagrams that picture an organization's current state are often referred to as "As-Is" diagrams. While diagrams that picture how an organization might be as a result of changes are often termed "To-Be" diagrams.

Some modeling tools are specialized and only assist in the development of a specific kind of diagram. Thus, some tools only support process modeling, or the development of a business or enterprise architecture. On the other hand, many support numerous different kinds of diagrams and, consequently, can be used for a variety of different purposes.

### **Simple Drawing Tools Versus Repository-Based Modeling Tools**

A key distinction can be made between tools that assist in the development of graphics and those that are based on databases or repositories. The former really only automate what could otherwise be done with a pen and paper – they make it easy to create a diagram. The latter use the graphic as a way of populating a database and for saving information from multiple diagrams, thereby gradually accumulating data about a wide variety of different models. Well designed business modeling tools rely on a metamodel that defines the basic objects one might want to discuss – departments, managerial roles, processes, subprocesses, activity costs, entities generated – and the relationships that exist between them. Consequently, using such a tool, once you have indicated that activity A produces an output that is an input of activity B, then, henceforth, whenever you consider activity B in any other diagram, the tool will “know” that it receives inputs from activity A. Similarly, if you indicated that manager M is in charge of department D, and that activity A is performed by department D, the tool will know that manager M is responsible for activity A. If you subsequently asked the tool to generate a list of all of manager M’s responsibilities, activity A would appear on the list. Thus, using a repository-based modeling tool, you gradually accumulate information about the organization’s structure and processes.

Many managers use simple graphical tools to create organization diagrams or models of process flows. These tools are useful for simple tasks. Increasingly, however, companies seek to collect and integrate information to enable managers to analyze organizational processes in more sophisticated ways. For example, some executives want to be able to examine the performance measures indicating how major value chains are performing. If a given value chain is not performing up to expectations, those same executives would like to drill down and determine the process or subprocess that is deficient. They might even want to determine who manages the activity that is deficient, what it costs to perform the activity last month, or what would happen if half the employees assigned to that activity were switched to another. This kind of integrated information can be maintained by the best architecture and process modeling tools and these types of questions can be asked of tools that provide various types of simulation capabilities.

In this report we ignore the simple graphic tools and focus only on tools that maintain data about the models that are created. Beyond that, however, we consider a wide variety of products.

### **Modeling Tool Users**

Different modeling tools are designed with different groups of users in mind. Some are designed to support a specific group of users – say business managers – while others are intended for more technical users like business analysts or IT developers.

Simulation, for example, can be complex. Consequently, it is difficult to produce a tool that makes it simple for managers to create effective simulations. Thus, there is a natural divide between general purpose process modeling tools that support some simulation and those tools that are, in essence, designed for a more technical audience that understands more about simulation and therefore wants a more sophisticated simulation tool.

Another distinction can be found between modeling tools that are designed primarily for business managers or business analysts and those designed to support both business analysts and IT analysts. The former tend to have a less complicated user interface. This is because they don’t need to consider all the complexities that the latter must support if they were to also support software modeling or code generation in addition to process modeling.



In this report we include tools whose primary user audience includes business managers and business analysts. Put a different way, we include tools that can be used to model, analyze, redesign or improve enterprise architectures and business processes. Some of these tools also provide interfaces for IT developers and we include those tools, provided that they also make a serious effort to support business managers or analysts.

We have excluded tools that are primarily designed for software analysts and developers.

In a similar way we have excluded tools that are designed to execute business process management applications. Although these BPM Suites all include process modeling environments, their primary focus is on defining processes that the BPM Suite can manage when the process is actually executed. In addition, most have interfaces more resembling IT analysis and design tools than the tools reviewed in this report.

### **Support for Process and Architectural Frameworks**

Some tools are generic and can be used for any type of architecture or process modeling. Others incorporate support for process or architectural frameworks that make them easier to use for specific types of analysis and modeling. Thus a tool that supports the Supply Chain Council's SCOR framework provides supply chain managers with a leg-up when it comes to modeling a supply chain process. On the other hand, the SCOR framework doesn't help someone that's trying to model a New Product Design Process.

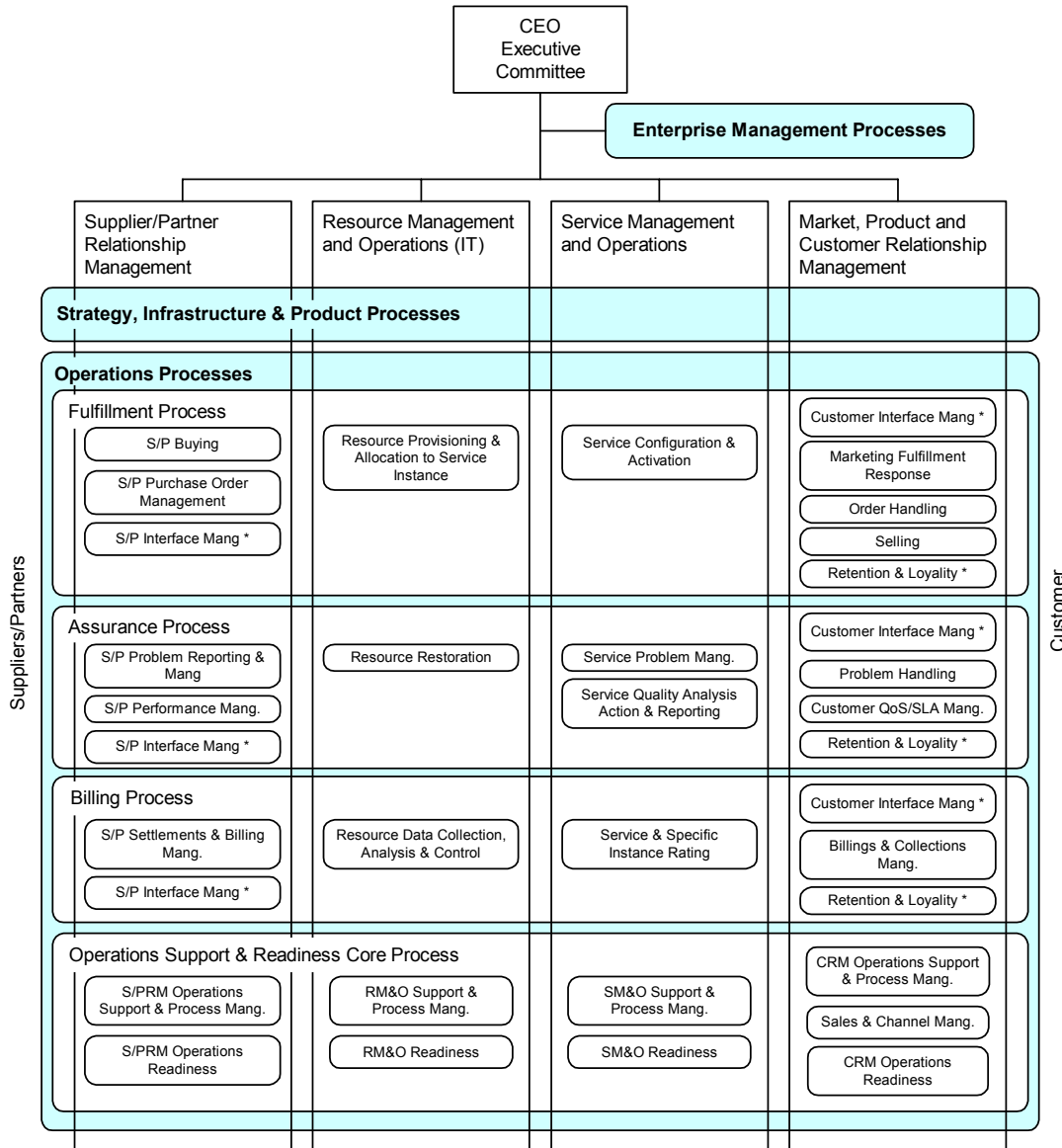
Tools that support frameworks can do so in different ways. SCOR consists of a set of modeling conventions, named processes like Source, Make and Deliver, metrics for evaluating those processes and best practices to help analysts evaluate whether existing processes could be improved. A tool may support SCOR simply by making it possible for a manager to create boxes and label them Source, Make and Deliver. Or it may support SCOR by supporting the specific notation used by the Supply Chain Council. It may even go further and package all of the SCOR metrics and best practices in a database so that a developer can quickly determine the appropriate measures for a Source process, for example. Hence, support for the SCOR framework can be rather difficult to determine.

There is a sense in which SCOR is a horizontal process framework. Most companies have supply chain processes and any company with a supply chain process can use SCOR. The TeleManagement Forum is a consortium of telecommunications companies that have developed a framework that describes the specific business processes of telecom companies. The current version, called the eTOM framework, is the third iteration of a Telecom Business Process Architecture. Earlier designs only described the operational processes within telecom companies. As companies began to implement e-business applications, however, they discovered that processes included in general and enterprise management had to be added to the architecture. One of the major advantages of e-business systems is that they integrate management and operations and it is important that everyone have a clear overview of all the processes if they are to see how integration might occur.

Figure 1 shows the eTOM framework. This figure also provides an idea of how a telecommunications company is organized. In essence, a telecom sells time on its network to customers. Since the time is sold and monitored by means of computers that track phone access, Service and Resource are important functions. Since almost all long distance phone calls cross multiple networks, arrangements with other telecom companies – partners – are very important. We suspect that actual phone companies might subdivide their departments somewhat differently; placing marketing and service in separate departments, but remember that most phone sales and service requests come in through a common call center, so this high-level grouping works reasonably well. In any case, Figure 1 provides an idea of how a group of telecom managers felt they could represent their organizations.



Figure 1 also provides a nice idea of an organization diagram. In essence, this diagram shows departments, some reporting relationships, and how processes cut across departmental lines. Increasingly, architecture and process modeling tools are including the ability to create high-level organization diagrams, like the one in Figure 1, to help managers obtain a broad prospective of how processes are used within an organization.

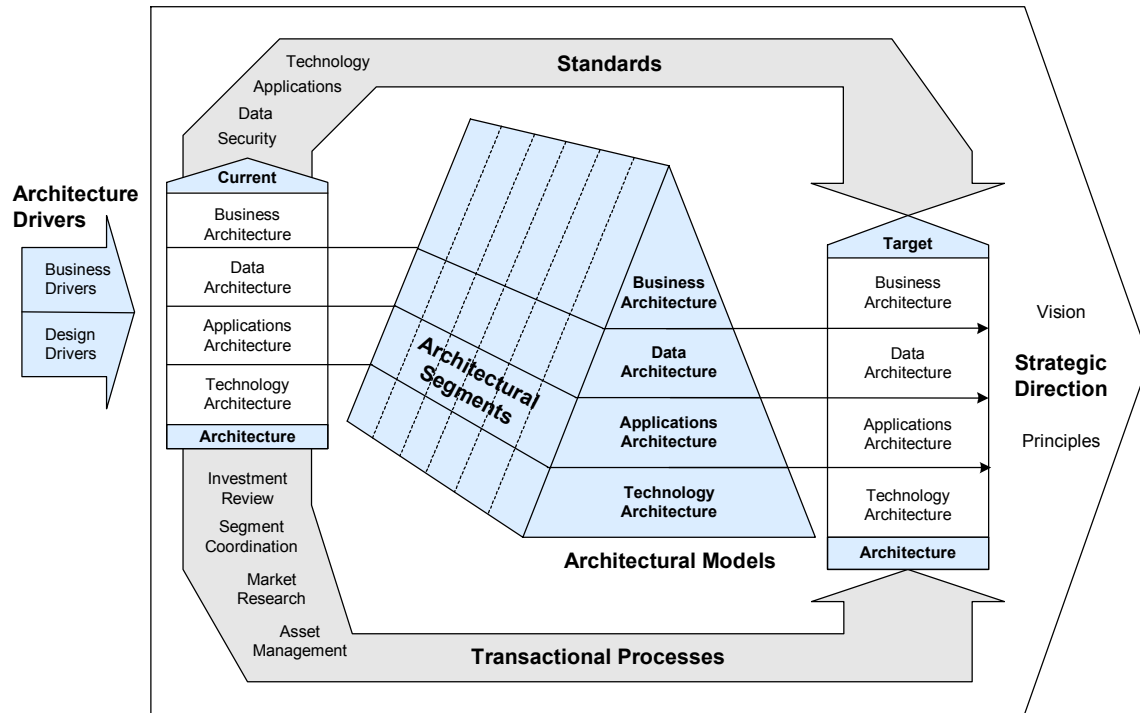


**Figure 1. A detailed version of the eTOM Business Process Architecture.**

Just as there are process frameworks, like eTOM and SCOR, there are architecture frameworks that structure organizational data according to different conventions. The Zachman Framework, for example, is designed to organize company information according to a specific set of categories. At the moment the most interesting work in Business or Enterprise Architectures is taking place in the US government, which is under a congressional mandate to develop and use Enterprise Architectures to structure the management of their processes and to guide their business decisions. Different US government agencies have created different architectural frameworks to organize their information.



For example, the US government’s CIO council has defined the Federal Enterprise Architecture Framework (FEAF) which is pictured in Figure 2.



**Figure 2. The Structure of the FEAF Architecture.**

A number of government architectures, including the US Department of Defense’s C4ISR framework, and the Treasury Department’s Treasury Enterprise Architecture Framework (TEAF) are variations on the FEAF. In essence, these architectures define departmental goals and strategies, and, in some cases, process architectures, but their focus is primarily on organizing IT resources. As with SCOR, a given tool can support an architecture like FEAF in a minimal way, or it can provide a wide variety of different utilities to make it easy for analysts to document and generate reports that accord with the conventions of one of these architectures.

Some tools provide generic organizational diagramming capabilities. Others supplement their generic capabilities with specific architectural frameworks that make it easier for users to apply specific architectural conventions to structure their organizational models and organize the data they gather about their processes.

There is a large number of different frameworks and vendor support for frameworks varies considerably. Hence, some tools support a wide variety of different frameworks while others specialize in supporting only a few specific frameworks.

**Different Notations and Different Methodologies**

There are a few popular methodologies, like Balanced Scorecard, Six Sigma, and Lean, and there are popular notations described in books by process methodologists like Burlton or Rummler, or by consulting firms like CSC or Accenture. Most companies have their own methodologies and notations that they have created by combining one or more of these public approaches. In a similar fashion, most of the modeling tools offer proprietary notations in addition to supporting other popular notations.

Some modeling tools support 20 or more different types of diagrams and dozens of different notations. Others support only one or a few notations and only a few types of diagrams. Additionally, some allow users to tailor notations or diagrams to suit their own conventions.

Some companies buy modeling tools for use by a specific project team or group. Others seek to standardize on tools that everyone in the organization can use. If a company only wants a tool for a specific purpose, then it will only care that the tool supports a specific set of diagrams using a single notation. On the other hand, if a company wants to standardize on a tool that many different groups can use for diverse tasks, it will probably want a tool that supports a wider variety of notations and methodologies.

For instance, a Six Sigma project team usually does not require a tool that supports very complex process diagrams. They are more concerned with the specific types of diagrams commonly used by Six Sigma practitioners, like “fishbone” diagrams, and by the ability of the tool to determine certain statistical measures. However, a redesign team that plans to change a process and then hand the results off to an IT group that will develop software to automate the process will probably insist on a tool that can not only do simple process diagrams but can also support the popular UML diagrams that software designers typically use. Similarly, business managers who are designing processes that will be automated by packaged applications from a company like SAP or Oracle will probably want a modeling tool that includes features for showing how processes will relate to specific packaged modules.

### **Standards**

There are also concerns about standards—and many have hailed recent efforts to bring more standardization to the process modeling market. Two important standardization efforts include the development of the Business Process Modeling Notation (BPMN) and the Unified Modeling Language (UML) version 2.0.

The BPMN was created by the Business Process Management Initiative (BPMI) organization. BPMN is designed to facilitate the graphical representation of business processes. It is important because it provides both a standard way of describing business processes and it can be used to generate BPEL, an XML-based business process execution language. Specifically, BPMN is designed so that a user can use a BPMN diagram to generate BPEL code. (This would standardize the approach that many BPM Suites vendors are taking.) A number of modeling tool vendors have added BPMN support to their products as well as interfaces for generating BPEL code from BPMN diagrams created in their tools.

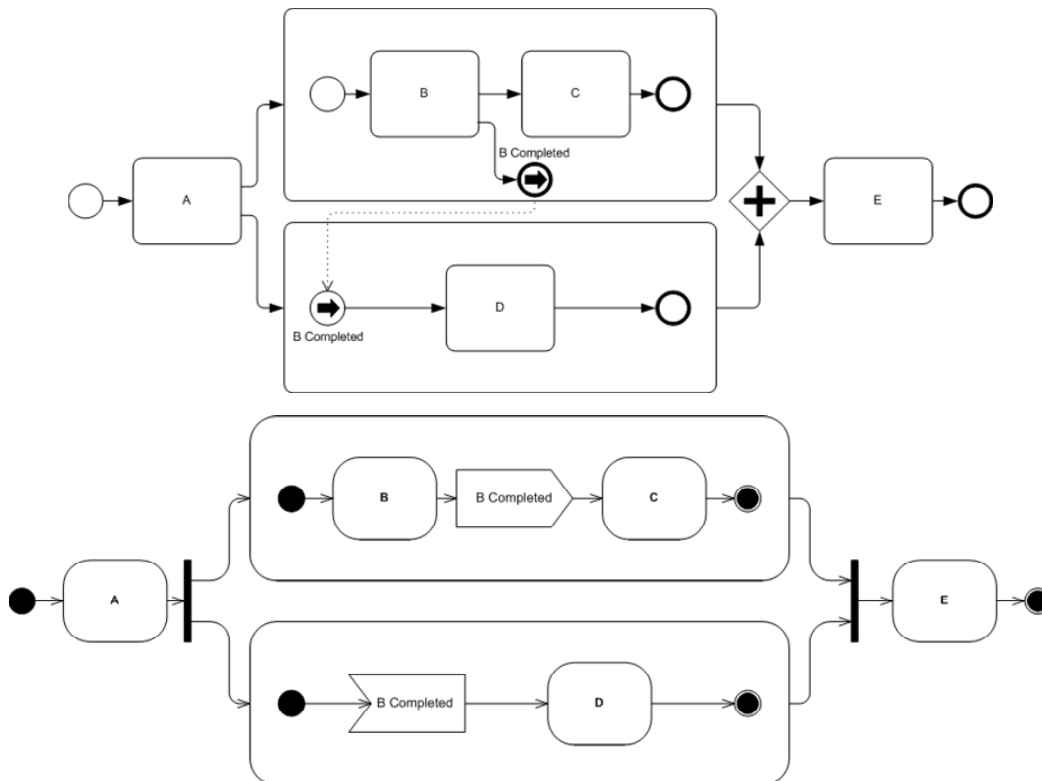
Modeling tools that support BPMN make it easy for users to move from a model created in one tool to a BPM Suite that runs BPEL. It's too early to determine how popular BPMN will become, but some modeling vendors are embracing the notation because of the widespread interest in BPM among some customers.

BPMN comes in two versions, a simple version that business managers can use and a more sophisticated version that provides all the details needed to generate software code. Companies that use tools that support BPMN are, in effect, using a tool that both business managers and IT developers can use to coordinate the move from an informal workflow diagram to a detailed specification that a BPM Suite could execute to manage an ongoing process. (See Figure 3.)

Initial versions of the Object Management Group's (OMG) -UML (UML 1.0, 1.1) standard were primarily used by software developers for process automation efforts. However, UML was never very popular with business users. The latest release of UML, version 2.0, represents a major redesign of the language and includes a much improved Activity Diagram notation which has generated a lot of interest among organizations that use UML for software development. In essence, as with the BPMN, if business modelers use UML Activity Diagrams they can be passed to IT developers who can then use those diagrams as the starting point for software development.

The OMG is also working on a business process metamodel which will facilitate translating one model into another. Thus, companies using UML Activity Diagrams can later convert them to BPEL or to Java.

UML Activity Diagrams and basic BPMN diagrams are very similar, and it is possible they will be combined or linked in the near future. (See Figure 3.) No matter what happens, the similarity between BPMN and UML Activity Diagrams suggests that in the near future business modeling tools will be shifting away from their various proprietary notations to one of the standard, public notations.



**Figure 3.** This diagram is from an article published on BPTrends by Stephen White, entitled *Process Modeling Notations and Workflow Patterns*. Both picture the same process. The top diagram is a BPMN diagram and the bottom is a UML Activity Diagram.

In a similar way the OMG is working on a set of standards and metamodels that will make it easier to exchange model information between tools and databases. The most important, at this moment, is XMI, an XML language for exchanging modeling information. Most companies will want to buy tools that support XMI to assure that if they subsequently decide to shift to a new tool or database they will be able to utilize existing models and documentation they have created in the earlier tool. Most modeling tool vendors either support XMI or have announced their intention to do so.

Support for the OMG’s business process metamodel, or the business rule metamodel, is premature, since these standards are not yet complete. We mention them only to remind readers that any modeling tool vendor that wants to remain at the cutting edge will need to continue to modify their product in the years ahead. As new standards are completed and published, companies will want to use tools that support those standards. Thus, the competition between tool vendors will intensify in the years ahead as new standards are introduced and the vendors rush to support them.

No matter what standards one is interested in, standards present special problems because they are rapidly evolving. For example, the initial release of UML 1.1 supported a dozen different types of

diagrams. The recent release of UML 2.0 changed the names of some diagrams, added others and introduced an even more complex set of notations. Thus, it's not enough to know if a modeling tool supports UML. One needs to know if it supports UML 1 or 2, and, in most cases, what specific UML diagrams it supports.

#### **Support for Specific Operating Systems or Technical Infrastructures**

Up until now we have only discussed architecture or process-oriented features of these tools. All of these tools are also software products and thus users will also be concerned by the software infrastructure and the operating systems that these tools support. Companies committed to Microsoft environments will prefer tools that work with Microsoft infrastructure products. Similarly, companies that want to develop Internet applications will want tools that support Internet protocols and emerging Service Oriented Architecture (SOA) protocols.

#### **There Is No Perfect Modeling Tool**

At this point it should be obvious that there are lots of different types of modeling tools that fall within our definition. By focusing on specific groups of users, on specific tasks, and by supporting specific methodologies or frameworks a tool vendor can tailor its offering to assure that is more useful and therefore more popular with a niche audience. The perfect tool for one niche audience – say Six Sigma project teams – may not be the best tool for another audience – say business architects that want to create a repository of all the business processes in the company. It would be nice if we could subdivide the tools and say which is best for each niche, but the market is too small. Thus, most vendors have tried to create tools that can be used by more than one audience. As a result, many vendors offer a core product and then a variety of extension or add-on products that can be used to make the tool more useful to one or more specialized audiences. In addition, most vendors position their product as a contender in more than one niche market. For example, a simulation vendor offers a tool that can be used by both simulation specialists as well as general process modelers. Another vendor offers a tool that is good for both enterprise architecture work and redesign projects. Consequently, at this point in time, we concluded that the best we could do was to try to describe each tool as accurately as possible and let readers decide which mix of features would work best for them.

### **3. The Market for Business Process Modeling Tools**

Modeling tools are used by business managers and business analysts to analyze and document the way organizations and processes work and to determine how processes can be improved.

There are a number of drivers, but they all fall under one of two broad categories. When times are tough, companies want to minimize costs. That entails making processes more efficient, leaner, or more automated. When times are better, organizations seek to grow their markets or enter new markets. In essence, companies seek to take advantage of new opportunities presented by new customers or new technologies, or both. That entails creating new processes, using new technologies to create better processes, or simply reorganizing existing processes to offer more value to customers. Some business activities increase or decrease with the business cycle. Process analysis, modeling and process change is constant, serving first to improve efficiency, then to add new capabilities and then, again to make the new capabilities more efficient, and so on.

What has changed recently is that senior management teams are putting a greater emphasis on process-based management. In effect, senior managers want to develop a more integrated overview of their organizations. They want to be able to see how performance relates to specific processes and activities and how resources are used by specific activities. In other words, managers want to be in a position to change quickly--either to save money or to take advantage of a new opportunity. It is popular, today, to say that executives want their organizations to be more agile. And many business executives have concluded that organizing around processes provides better control and more agility.

In many organizations this has translated into matrix management systems in which some managers control the departmental groups while others work to maximize the efficiency of processes that cut across departmental lines. As this trend grows, there is a need for pictures of the organization that stress processes. The old organizational chart with its departments simply doesn't provide enough information.

The combination of the perennial need for process models and the newer interest in modeling the entire organization and showing how processes and departments coordinate their responsibilities have combined to drive a rapidly growing market for business modeling software products that shows no signs of abating.

### **Modeling Tools Versus BPM Suites and IT Modeling Tools**

Business Modeling Tools, BPM Suites, and IT Modeling Tools are, in a general way, very similar. They all provide users with a way to define a business processes. Some will wish their company could simply buy one tool that everyone could use. To date, however, that approach has not proved popular. The fact remains that although the tools are similar in many ways, the audiences that use them are rather different and require tools that emphasize different capabilities. Thus, today, there are three more or less independent markets: one for vendors selling tools that can be used to analyze, model and redesign organizational architectures and business processes, one for those who want tools to manage the execution of business processes (BPM Suites), and one for those who want to develop software applications. Given the size and specialized concerns of each group, we don't expect these markets to merge anytime soon.

Put another way, business managers find modeling tools difficult to use. Surveys consistently show that the majority of business managers use text outlines and simple graphic drawing tools to describe business processes. Those business managers who are willing to use more sophisticated products use what this report terms *modeling tools*. Similarly, most business analysts use modeling tools. Both managers and business analysts like the relatively straight-forward user interface associated with the modeling tools. In addition, they use modeling tools because they have features like Organization Mapping and Activity Based Costing that business people find useful, or they provide simulation capabilities that some business analysts find useful. Those same managers tend to reject modeling tools that become overly complex by including features to support process execution or code generation.

### **Analyzing Your Need for a Modeling Tool**

The reality, however, is that even the market for enterprise or process modeling tools is rather complex. To help you evaluate tools to determine if they provide the support you need for your projects, we have created a list of features that a product might have. We describe these features in the next section and use the same ordered list as we evaluate each product and to organize the matrix at the end of the report that summarizes the features of each product.



## **A Detailed Analysis of Enterprise Architecture, Process Modeling and Simulation Tools**

### **1. Product Overview**

This section considers in some detail the organization and features of the modeling tools included in this report. The tools at the heart of this report are process modeling tools. Companies use these tools to model, analyze, and redesign business processes. Some of these modeling tools include additional capabilities that facilitate the analysis of business or enterprise architectures. Similarly, some of the modeling tools include support for process simulation. At the same time, there are specialized tools designed just for Enterprise Architecture development, and there are tools that are primarily designed to do more sophisticated simulations. Increasingly, however, companies are tending toward tools that model both architectures and processes and also support process simulation.

Rather than speak of *Enterprise Architecture, Process Modeling, and Simulation Tools*, we will simply refer to the products as *Modeling Tools*, except in those specific instances when we refer to tools that only exhibit one of the three capabilities.

We will follow the same outline used in this chapter as we consider each specific product. Similarly, we will follow this same sequence in the Matrix when we summarize the features of each product.

We will begin each product review by providing an overview that describes the overall organization and packaging of the tool. Many of the products offer entry level and advanced tools and a variety of add-on modules. We will also note which specific functions the tool is primarily designed to fulfill.

### **2. Product Architecture**

#### **2.1. Architecture Overview**

The second section of each product review provides an overview of the general architecture of the tool. It examines deployment options for the tool, including availability of desktop and client-server versions. For the most part, vendors are moving to a server model in which end-users interact with the tool's graphical modeling and analysis components and its repository via a web browser or portal interface. This makes it possible for users to sign on from anywhere in the world and access process models. At the same time, most vendors also provide a desktop environment for developers who enter the basic diagrams or maintain processes in a repository.

#### **2.2. Usability and User Interface**

We also consider usability and User Interface (UI) features – including web deployment capabilities and whether a tool is designed to support general business users, the more technical analyst, or both. Support for a variety of users is important because, increasingly, organizations are moving to tools that provide their business users with the ability to model and analyze processes and then distribute and share their models with other users distributed throughout the organization, including other business users as well as technical analysts and IT personnel. Different types of users need different interfaces if they are to derive the maximum use from the tool.

#### **2.3. Repository Options/Team Development**

All of the sophisticated modeling tools rely on metamodels that describe a set of objects and relations. These definitions are used to define a repository in which modeling information is maintained. The repository, in turn, is maintained in a database. Some tools have rather narrowly defined metamodels. That means they can only store information about rather specific types of



objects and relationships. Other vendors offer very flexible metamodels, in which case the vendor or user can rapidly define new symbols or notations and can store a much broader range of information about architectures or processes.

Vendors support a wide range of options as to which databases can be used to host their repository. Some tools only support one database that is embedded in the tool. Most allow users to use any of several different databases. Some support both relational and object-oriented databases.

Some organizations will want a tool that supports distributed team development. The functionality provided to support this option varies considerably. Some tools provide basic capabilities that allow users to publish models and model information to HTML, thereby allowing other users to access them in read-only format via a Web browser. Other tools provide more sophisticated repository-based features. These include allowing authorized users to share the analysis and design of a process by enabling them to check-out parts of the process from the repository when they want to work on them and check them back in later. Such tools also provide sophisticated versioning and control procedures designed to synchronize model changes and maintain overall model/design integrity. In addition to supporting multi-user team development, some tools also provide remote access capabilities that allow users to store and manage business models and their associated objects remotely via the Internet.

In contrast to more sophisticated repository-based tools, some tools provide more limited capabilities for managing modeling information and supporting team development. These tools employ various file-based systems techniques for multi-user development, such as record locking and project locking. Record locking means that when a specific record (i.e., diagram or other piece of data) within a project is being worked on, no other user can access or modify it; however, the rest of the project file is available for other users to work on. Project locking allows a user to take a project file off-site to work on. In such instances, the tool is either set to disallow access to all other users, or to provide a warning that the project has been “checked out” and provides essential details (i.e., when and by whom the file was check out). Finally, some products rely on third-party configuration management systems (CMS) and repository tools for managing models and associated design information.

#### **2.4. Integration with Other Products**

Modeling tool users increasingly want to link their tools with other third-party tools and applications in order to export and import modeling and other information that can be used for project management, publishing and diagramming, software design, and for databases development efforts. Consequently, in addition to providing basic APIs (COM, ODBC, etc.), some vendors also offer pre-built bi-directional interfaces designed specifically for interfacing their modeling tool with popular programs like Microsoft Project, Word, Access, Visio, IBM Rational Rose, or ERwin. In addition, some vendors even offer options for integrating their products with external applications at runtime (for real-time, on-demand simulation, etc.), also providing support for web services and SOAs via Java RMI, SOAP, and other APIs.

### **3. Analysis and Process Modeling**

Section 3 of each review provides a more in-depth look at the actual graphical modeling and analysis capabilities provided by a product. Section 3 is divided into four subsections, which are each, in turn, subdivided. The four basic subsections are

- 3.1 Defining Enterprise and Organizational Models
- 3.2 Defining Processes
- 3.3 Representing/Handling Subprocesses and Activities
- 3.4 Simulation

**3.1. Enterprise and Organizational Models**

An Enterprise Model is usually a formal model that describes the kinds of information that an organization wants to track. Figure 1, for example, illustrates the Zachman architecture. Zachman defines categories of information and relationships between the various categories. In essence, this provides a company with a way to organize the kinds of information it is going to keep track of as it analyzes its processes and the resources used in those processes. As a generalization, enterprise models are created or maintained by external groups like the DOD or the Zachman Institute, and the vendor simply makes the model or its elements available within the tool. However, many vendors also offer proprietary enterprise models that they have developed as the result of the experience gained by their consulting groups assisting clients with various enterprise architectures and business process initiatives.

		← Abstractions (Columns) →					
The Zachman Framework		DATA <i>What (Things)</i>	FUNCTION <i>How (Process)</i>	NETWORK <i>Where (Location)</i>	PEOPLE <i>Who (People)</i>	TIME <i>When (Time)</i>	MOTIVATION <i>Why (Motivation)</i>
↑ Perspectives (Rows) ↓	SCOPE (Contextual) <i>Planner</i>	List of Things Important to the Business	List of Processes the Business Performs	List of Locations in Which the Business Operates	List of Organizations Important to the Business	List of Events Significant to the Business	List of Business Goals/Strategies
	BUSINESS MODEL (Conceptual) <i>Owner</i>	Semantic Model	Business Process Model	Business Logistics System	Work Flow Model	Master Schedule	Business Plan
	SYSTEM MODEL (Logical) <i>Designer</i>	Logical Data Model	Application Architecture	Distributed System Architecture	Human Interface Architecture	Processing Structure	Business Rule Model
	TECHNOLOGY MODEL (Physical) <i>Builder</i>	Physical Data Model	System Design	Technology Architecture	Presentation Architecture	Control Structure	Rule Design
	DETAILED REPRESENTATIONS (Out-of-Context) <i>Sub-Contractor</i>	Data Definition	Program	Network Architecture	Security Architecture	Timing Definition	Rule Specification
	FUNCTIONING ENTERPRISE	Actual Business Data	Actual Application Code	Actual Physical Networks	Actual Business Organization	Actual Business Schedule	Actual Business Strategy

**Figure 1. The Zachman Enterprise Architecture.**

An Organization Model is a more informal model developed to picture how a company is organized. One popular organization model shows departments and value chains to illustrate which departments are responsible for which aspects of specific processes. A company may create an organization model to better understand its operations, or it may create it to serve as a way of organizing the information it is going to track and store. Figure 2 provides an example of an Organization Model. Organization models are often specified by process methodologies, but are informal and developed on a company by company basis. Thus, tools support organization models by providing a modeling notation that can be used to create an organization model.

In section 3.1 we begin by examining how different products support different enterprise architecture models. Many tools, for example provide diagrams that reflect popular architecture and let users organize their repository and diagrams in the categories provided by the specific architecture.

We also consider how tools support modeling company organizational structures and relating processes to organizational units. And we look at each tool’s ability to document performance strategies and goals, and the ability to model resources and define usage patterns for their usage. Finally, this section considers a tool’s features for managing process portfolios. These topics are described in detail in the subsections of 3.1.

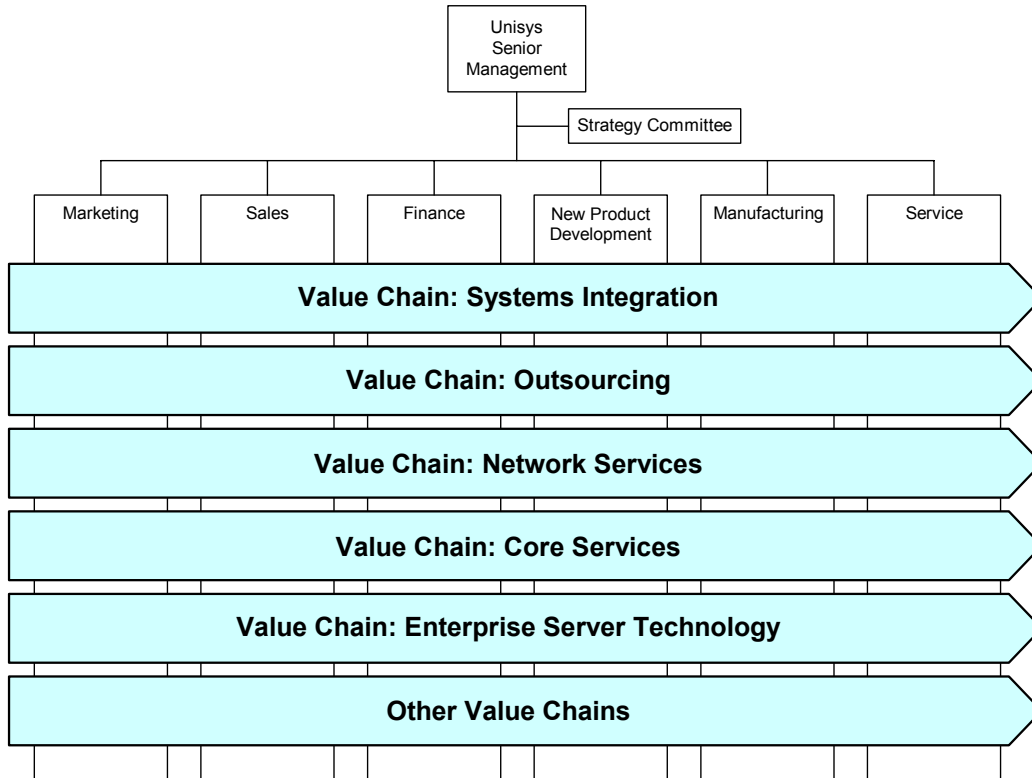


Figure 2. An Organization Model Picturing Unisys Value Chains.

**Enterprise Architecture Models**

In 3.1.1 we describe the specific enterprise architecture models supported by the modeling tool. Some of the more popular architectures include Zachman, Enterprise Architecture, TOGAF, and DoDAF. In addition, as noted previously, many vendors also offer their own proprietary enterprise models for use with their tools. Finally, we also consider how some vendors provide organizations with the ability to customize their products to support their specific enterprise architecture modeling needs.

**Organizational Models**

To varying degrees, modeling tools provide the ability to create models that graphically depict organizational structures and to relate various processes to different organizational units. Some tools provide the ability to create complex, hierarchically structured organizational models that graphically depict how organizations report to other organizations and how specific roles report to organizations. In addition, some tools can relate processes to organizational units through the use of swim lanes and other techniques in a workflow model. Swim lanes graphically depict who or what (e.g., an organization, a system, a specifically defined role, etc.) is responsible for specific activities. The swim lane paradigm is a popular one because it tends to be easily understood by most of the business community.

### **Resource and Cost Modeling**

Here we examine the ability of a tool to support modeling a range of resource categories, including equipment, systems, people, roles, consumables, facilities, services, organizations, and so on. We also consider capabilities for enabling end-users to capture information and data related to these resources, as well as the tool's ability to be used to define resources with such criteria as cost, schedules, and usage patterns.

### **Mapping Organizational Strategies to Processes/Performance Measures**

In section 3.1.4, we examine a tool's ability to support the documentation of performance strategies and goals as well as features for mapping or associating performance strategies and goals to a process activity. Such mapping capabilities are useful because they can be used to help define the traceability of relationships – for example, goals to activities, or systems to roles, etc.

### **Managing Process Portfolios**

This section considers product features for actively managing a portfolio of processes. For example, some tools provide facilities that allow users to partition the repository with portfolios and manage and maintain models via a portal or Web interface. Other products are designed to work with third party Configuration Management Systems (CMS) or repository tools.

## **3.2. Defining Processes**

Section 3.2 examines the way modeling tools allow users to define processes and how a tool stores information about processes and what mechanisms are used to support and enforce process integrity. It also examines which graphic notations a product supports and the ability to create tailored notations.

### **Defining Processes**

Modeling tools vary in the capabilities they provide for graphically describing and modeling an organization, enterprise architecture, processes within an organization, or processes that span multiple organizations. In addition, some tools provide the ability for users to build models textually by translating Word or Excel programs into graphical models.

### **Process Information Storage and Integrity**

Most tools store process information in a database or repository, and the mechanisms employed to support and enforce model/process integrity can vary. Some tools provide model/process consistency through their pre-defined modeling languages, which include controls for enforcing model and object behavior. Some tools also provide additional utilities in the form of spelling, completeness, and semantic checkers for further ensuring model/process integrity – for example, to verify models for compliance with certain rules to ensure that the business processes are mapped logically and meaningfully and/or according to a specific business process methodology.

### **Graphical Notations**

All the leading modeling tools employ some form of graphical notation and suggest some methodology to support process analysis, process improvement, or process redesign efforts. Most vendors' tools use proprietary notations. Some support commercial or standard notations. The most popular include Enterprise Architecture, Information Engineering, Rummler-Brache, IDEF, UML Activity Diagrams, and the Business Process Modeling Notation (BPMN). In addition, some vendors also provide the ability for organizations to customize notations to support their specific modeling needs.

The Business Process Modeling Notation (BPMN) was recently created by the BPMI organization. It is designed to facilitate the graphical representation of business processes. Specifically, BPMN is designed so that a user can use a BPMN diagram to generate BPEL code. This would standardize the approach that many BPM Suites vendors are taking. Modeling tools that support BPMN make it easy for users to move from a model created in one tool to a BPM Suite that runs BPEL. It is too

early to determine how popular BPMN will become, but some modeling vendors are embracing the notation because of the widespread interest in BPM among some customers.

BPMN comes in two versions, a simple version that business managers can use and a more sophisticated version that provides all the details needed to generate software code. Companies that use tools that support BPMN are, in effect, using a tool that both business managers and IT developers can use to coordinate the move from an informal workflow diagram to a detailed specification that a BPM Suite could execute to manage an ongoing process. (See Figure 3.)

Initial versions of the Object Management Group's (OMG) Unified Modeling Language (UML 1.0, 1.1) were primarily used by software developers for process automation efforts. UML was never very popular with business users. The OMG's latest release of their modeling standard, UML 2.0, represents a major redesign of the language and includes a much improved Activity Diagram notation which has generated a lot of interest in organizations that use UML for software development. In essence, as with BPMN, if the business modelers use UML Activity Diagrams they can be passed to IT developers who can then use those diagrams as the starting point for software development.

The OMG is also working on a business process metamodel which will facilitate translating one model into another. Thus, companies using UML Activity Diagrams can later convert them to BPEL or to Java.

UML Activity Diagrams and basic BPMN diagrams are very similar, and it is possible they will be combined or linked in the near future. No matter what happens, the similarity between BPMN and UML Activity Diagrams suggests that in the near future business modeling tools will be shifting away from their various proprietary notations to one of the standard, public notations.

### **3.3. Subprocesses and Activities**

This section examines the capabilities of a modeling tool to represent and manipulate subprocesses. It also examines how end-users define activities and enter and document decision rules, and the ability of a tool to store data related to cost, resources, and time required by specific activities.

#### **Subprocesses and Activities**

Most products incorporate the ability to handle subprocesses as part of the overall process model. Precisely how this is done can vary considerably among products. Some tools allow for nesting of subprocesses within processes. Some tools do not allow for nested subprocesses. The capability to nest models can be useful because it provides the ability to drill down from the parent level and obtain a more granular visualization of a process. If a company wants to develop value chain models and use them to see which specific processes are used in which value chains, nested subprocesses can be very useful.

#### **Defining Activities**

A *process* is any sequence of steps that is initiated by an event; transforms information, materials, or business commitments; and produces an output. Most metamodels and notation systems use the term *activity* as the smallest unit of a process that is normally pictured on a graphical diagram. (Some methodologists prefer *step* or *task*, but we will use *activity*.) Thus activities usually define a unit of work that is performed by one or a group of employees following the same procedure, or by a single software module. Although methods for doing so vary among products, most tools allow end-users to associate information about an activity with the activity pictured in the diagram – for example, resources used by the activity and any steps that take place during the performance of the activity – and then to store the information in the tool's repository.

#### **Documenting Decision Rules**

Some activities are well-defined procedures, while others involve the application of rules and decisions. An example of a possible decision rule is

*No expense report is processed before supporting documentation arrives.*

Similarly, some decision points on diagrams are straightforward, while others require the application of rules just to determine to whom the work should go next.

The ability to associate rules with activities or decision points within a process is an important feature of any modeling tool because it allows end-users to define activities and processes specifically and accurately. .

### **Rules Entry**

Most tools allow users to enter decision rules through a dialog box that provides the ability to define a rule and customize its individual properties. Some tools also allow users to enter rules textually.

### **Activity Costs, Resources, and Time Data**

Most modeling tools allow end-users to associate data about costs, resources, and processing times with specific activities. This information is then stored in the tool's repository. However, methods for capturing this information vary among products. Some products allow each activity in a process to contain its own cost, timing, and resource information. In effect, this information is tied directly to each activity, and it can be used for various purposes – for example, conducting simulations for different scenarios.

In other tools, costs are associated with the resources used and are stored as parameters of the resources themselves. The parameters of the activity include the resources required to perform the step, as well as the duration necessary to complete it.

## **3.4. Simulation**

This section examines the ability of a modeling product to support simulation of processes as well as capabilities for analyzing simulations. It also considers the use of real-time data feeds for simulation, and interaction of simulations, with operational systems, and the ability to distribute simulations across a network. Finally, it examines a tool's ability to capture and report on simulated metrics and its ability to apply statistical analysis to simulation data.

Computer-based simulation requires an engine to drive the calculation of model variables. The two methods for doing simulation are

- Systems Analysis – continuous and discrete simulations based on mathematical models and numerical methods.
- Discrete Event – discrete simulations based on an event-handling method.

Systems Analysis-based simulation is mostly associated with academic studies. Discrete Event simulation, on the other hand, is easily driven by the events that are generated in a business process. Thus, the completion of an application, the entry of the application into a database, the approval of funding for the application are all events. Process simulation tools are designed to track the events that occur during the execution of a process. To use a simulation system, the process modeler has to specify what happens when an event occurs. For example, how long does it take to approve an application? Is this a task that one person can accomplish in 15 minutes? How much does the time of that person cost? What resources are used in the approval process? How many minutes elapse between when an application is approved and when it is taken up by the person whose task it is to implement the funding decision? And so forth. To do simulation, you need a process modeling tool that allows you to store information about each activity. You also need to store rules to deal with more complex decisions.

With simpler simulation tools, you submit a set of case data (scenarios) and watch how the process handles the cases. Most tools allow you to track the time each work item remains at each point in the process, where bottlenecks occur, and what the cost would be per item of processing 100 items a



week, compared to the cost of processing 1000 items. Information like this can be very useful in deciding if a new process design will be as efficient as you hope.

Unfortunately, the data required and the decisions that must be made to set up a good simulation of a process are not trivial. Large systems are best simulated by creating a model with only key activities. But what are the key activities to model? And what statistical measures work best with different flow patterns? Experienced simulation practitioners have learned these things and can make the decisions quickly. Less experienced practitioners often make bad decisions and quickly find themselves making a much larger commitment than they expected. It is hard to simplify simulation tools too much. Thus, although many process modeling tools provide simulation engines, only a few of their customers actually use the simulation capabilities. On the other hand, individuals experienced enough to do good simulations often prefer more sophisticated simulation tools that give them more flexibility. Thus, although most process modeling products offer simulation, a few are especially popular with those who are experienced at simulation.

The most sophisticated simulation products can not only run sets of cases (scenarios) but can also monitor a system while it is being executed. To monitor a process while it is being executed, the product has to be designed to collect real-time data on an ongoing basis. And this, in turn, makes the tool more like some of the BPM Suites that manage and monitor process execution with less resemblance to most of the process modeling tools considered in this report.

### **Simulation Capabilities**

Most modeling tools provide some form of simulation capabilities, either as part of the tool or as an available, separate add-on module. The most popular technique is Discrete Event simulation. Discrete Event allows users to introduce a higher level of precision into the simulation process because it provides the ability to simulate the model of a business process as it evolves over time, with the passage of time tracked as a series of discrete events rather than as a continuous transformation.

### **Analytic Capabilities**

Analytic features vary among products. This section examines a product's ability to allow end-users to define multiple business case scenarios and perform process simulation to measure and analyze time, costs, resources, throughput, capacity, and bottlenecks, and associated activities. Such analyses are useful for visualizing and validating processes, uncovering problems, analyzing system states, and defining organizational responsibilities. They are also useful for designing and testing improvements pertaining to resource allocations and other scenarios.

In addition to the general simulation capabilities described above, some tools also include animation. This feature enables users to view an animation of a simulation as it runs in order to watch a business process execute step by step. It also lets you record animations for later playback. When playing back recorded animations, the user can pause, fast forward, and rewind the animation, which makes it a very powerful tool for analyzing business processes.

Finally, most tools offer the ability to export information and data captured during simulation to Excel and other programs in order to take advantage of their analysis and reporting capabilities.

### **Real-time Data Utilization**

Some products provide capabilities in the form of APIs, Web Services (SOAP, etc.), and other interfaces, enabling them to read data in real-time from operational systems and databases for use by a simulation engine. Such functionality is useful for testing and evaluating new process scenarios. Costs data, entity generation, and resource levels are just some of the ways you can use real-time data with simulation engines.



### **Model Distribution and Simulation on Enterprise Networks**

Some tools also offer capabilities for distributing simulation models across a network. This feature provides a number of benefits, including the ability to distribute a simulation dashboard (across a network) to different users – a very useful feature when using simulation for team-based or group analysis sessions.

### **Statistical Fit/Data Analysis**

Techniques for applying statistical analysis to simulation data vary among products. Some tools provide pre-defined methods for analyzing data captured during simulation – for example, activity-based costing (ABC), which allows users to approximate the actual operation of a scenario and provide predictive analysis. Some tools also feature specific interfaces for integrating with advanced statistical analysis packages from third party vendors, such as Averill Law and Associates' Expert Fit, or MINITAB. In addition, some tools also offer the ability to export information and data captured during simulation to Excel and other programs for statistical analysis.

### **Capturing and Reporting Simulated Metrics**

Capabilities for the capture and reporting of simulated metrics vary among products. In addition to allowing users to define their own reports, some tools provide various pre-defined analytic reports, which users can typically customize to suit their own specific needs. And while some tools just generate standard text-based reports, others can create highly graphical reports. Moreover, some vendors have augmented the standard reporting capabilities of their products with real-time plotting and graphing tools that are useful for dynamically highlighting process analysis behavior.

Finally, a number of tools also provide the ability to export statistical data to spreadsheets, databases (e.g., Access), and other productivity programs in order to take advantage of their analysis and reporting capabilities.

## **4. Business Process Methodologies**

The fourth section examines the types of business process analysis, redesign, and improvement methodologies supported by the modeling tools. As we are using the term, a *methodology* prescribes a set of steps that a company should follow to create an architecture, a redesign, or to improve a process or conduct a simulation. Some methodologies, like Rummler-Brache, are very comprehensive and consider all aspects of process change. Other methodologies, like Six Sigma, focus on improving specific processes. Methodologies are not necessarily associated with a graphic notation, or vice versa. There is a common notation usually used by those who employ the Rummler-Brache methodology, for example, but there is no specific notation associated with Six Sigma. Similarly, the BPMN notation is not associated with any specific business process methodology.

### **4.1. Business Process Methodologies**

Some vendors' tools use proprietary business process analysis, redesign, and improvement methodologies. Other tools are designed to support a variety of different methodologies, like Balanced Scorecard, Rummler-Brache, or Six Sigma. In addition, some vendors also provide users with the ability to tailor (i.e., customize) the tool to support different methodologies. In most cases this also includes the ability to define a specific notation.

### **4.2. Six Sigma Support**

Six Sigma has become a popular management methodology for improving processes and products through the development and application of fundamental process knowledge. To capitalize on this trend, some vendors now offer frameworks and templates designed specifically to enhance their product's ability to support Six Sigma efforts. Most Six Sigma projects do not rely heavily on process diagrams as such, since they tend to focus on relatively small projects. On the other hand, most Six

Sigma projects rely on specialized diagrams, like Cause and Effect or Fishbone diagrams, and a wide variety of statistical tables and tools. Tools that support Six Sigma usually provide ways to support these analysis diagrams and usually provide an interface to one of the popular statistical tools so that practitioners can undertake and record appropriate statistical data as part of the process improvement effort.

## **5. Report Generation and Document Management**

Many users will want to generate reports and publish models and other design information pertaining to their enterprise architecture and business process improvement efforts. For this reason, organizations should carefully assess a tool's particular reporting and document management capabilities. Some tools provide the ability to publish graphical models to HTML. And some provide capabilities for importing/exporting modeling data in XML (and other formats), or to business productivity applications like Excel and Access, in order to take advantage of the reporting and publishing capabilities offered by such tools. In addition, some modeling tools feature advanced graphical model interpreters that can translate graphical models (created in the tool) into English and publish these narrative text descriptions in Word (or HTML).

## **6. Development Environment**

### **6.1. Language of Tool**

This section describes the software programming language(s) in which the modeling tool is written.

### **6.2. Product Support, Maintenance, and New Versions**

We describe new product release schedules and vendor policies on the handling of bug fixes, and we document other product maintenance issues.

## **7. Software Modeling and Code Generation**

This section examines software modeling and code generation capabilities provided by a business modeling tool. Here we focus on a tool's ability to interface with popular software authoring environments in order to exchange conceptual and logical models. Similarly, we document a business modeling tool's ability to extract design information from other tools and to update automatically the design models in the business modeling tool's repository.

### **7.1. UML Model Generation**

Most of the modeling tools on the market do not generate software code. Instead, they focus on the business process modeling and rely on third party tools or add-on products (designed to support software design/development) to provide code generation. Of particular interest, however, is the ability of a tool to create UML, entity relationship, and other diagrams that can serve as a starting point for software generation, and then to pass them to software development tools for further development. Some tools provide basic capabilities for exchanging process models with software development environments (e.g., IBM's Rational Rose). Others provide the ability to link process models directly to UML Use Case models in other software environments. Such a linkage is useful because it can provide an understanding of where a system should provide functionality in support of a specific business process. When exported/published to HTML, models are automatically linked to provide users with an integrated view for business and systems requirements validation.

### **7.2. BPEL Generation**

The growing use of web services and the interest in BPM Suites that manage and execute business processes has led to the creation of new languages designed to facilitate the creation and execution of

business processes in web environments. BPEL is a generic XML-based language designed to facilitate the description of distributed business processes. BPEL is still under development; however, some modeling vendors now offer (or plan to offer) interfaces to their products that will make it possible to generate BPEL from process diagrams created in the tool.

## **8. Templates and Frameworks**

Some vendors offer horizontal and vertical industry templates or frameworks for use with their tools. These products are typically offered as add-on products. They are important because they offer organizations a way to “jump-start” their supply chain, telecom, insurance, higher education, Sarbanes-Oxley, and other enterprise architecture and business process initiatives.

## **9. Systems Administration and Security**

This section describes systems administration and security features provided by a product.

Some tools provide their own administration and security facilities, which take advantage of the check-in/check-out, versioning, and log capabilities of their repository systems to control user access to the tool and manage business models. In addition, some tools also let managers maintain business models (and associated objects) remotely across the Web, and to access log files to perform audits to determine what changes have been made to models, by whom and when. Of particular interest is support for role-based access – the ability for administrators to provide or limit access to a tool’s functionality (and to models stored in the repository, etc.), according to end-user roles (e.g., assigned tasks, responsibilities, etc.).

Finally, some tools rely on third party Configuration Management Products for managing business models and controlling access to the tool’s repository.

## **10. Scalability**

Section 10 examines product features designed to support scalability – both vertically (i.e., from small through large numbers of users) and horizontally (i.e., the ability to spread applications and work across the organizational network) – capabilities that are important for supporting large enterprise architecture and business process design and reengineering efforts. Additionally, some products can simulate large complex models as well as multiple, interrelated models.

## **11. Supported Platforms**

This section describes platforms supported by the various modeling tools.

## **12. Pricing**

Section 12 describes how vendors price their products. Pricing for modeling products covered in this report typically includes starting pricing for the core tool set and a limited number of users. In reality, most vendors offer a variety of add-on options for use with their tools. Consequently, actual pricing will vary considerably, depending on an organization’s particular business process modeling needs and the number of end-users licensed.

## 13. Company, Product Positioning, and Support

### 13.1. Company Background Information

This section provides vendor background information and considers any purported company strengths and weaknesses.

### 13.2. Positioning

This section describes product positioning. It also lists the activities supported by modeling tools. We consider six main types of activities:

**Enterprise architecture modeling and analysis** – a tool's ability to support modeling and analysis of enterprise architectures.

**Process modeling and analysis, redesign, and improvement** – a tool's ability to support the modeling and analysis of business processes for process redesign and improvement initiatives.

**Detailed process modeling and analysis** – a tool's ability to be used to conduct detailed process modeling and analysis through the use of simulation.

**IT support/software development** – a tool's ability to support IT and software development efforts (e.g., implementation of web services or service-oriented architectures, etc.).

**Human performance improvement** initiatives – a tool's ability to model and support human performance improvement initiatives (e.g., employee training programs).

**Development of management and measurement systems** – a tool's ability to support Balanced Scorecard, Six Sigma, and other efforts.

### 13.3. Product Training

This section describes product training services offered by vendors.

### 13.4. Business Process Consulting

This section describes available enterprise architecture and business process consulting services, and workshops offered by vendors.

## 14. Case Study

We provide a short case study to provide readers with a typical example of how each modeling tool has been used to solve some process change problem.

## 15. Company Offices

This section lists the vendor's main office and key subsidiary offices.

# ADONIS

Version: 3.81

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### 1. Product Overview

ADONIS is a key part of BOC's Management Office (which also includes ADOscore, ADolog, and ADOit) – a family of products for the integrated management of strategy, business processes, people, and IT. This report focuses on ADONIS, BOC's graphical business process modeling and analysis tool, its standard components, optional add-on components, and various interfaces.

Table 1 provides an overview of the ADONIS toolset (version 3.81) and its main add-on components and extensions. It also provides an overview of ADOscore, ADolog, and ADOit, which – although they are separate products – are based on the same meta model architecture as ADONIS and, thus, can be used in conjunction with ADONIS. ADONIS is available in two versions. ADONIS Business Edition focuses on process design, process analysis, process documentation, and process implementation. ADONIS Professional Edition, in addition to all the features provided by the Business Edition, supports process simulation, process evaluation, process monitoring, and controlling tasks.

ADONIS supports the core activities of BPM methodologies, including information acquisition, modeling and design, analysis, simulation, and evaluation. ADONIS also provides various import/export facilities, Web and standard publishing capabilities, and administration tools. Optional add-on components are available for Web-based modeling, activity-based costing (ABC), workforce and capacity planning, and call center management.

Key design aspects of ADONIS include usability, openness, method flexibility (customizability), and model maintainability. ADONIS supports non-technical users such as business analysts, process owners, and process managers, as well as more technically skilled information systems and enterprise architects interested in business processes and business process-related information such as documents, resources, systems, applications, and organizations.

ADONIS operates as either a stand-alone tool on desktops or laptops, or in a multi-user environment utilizing a central repository.

ADONIS supports standard modeling languages such as BPMN, UML, EPC, and LOVEM. In addition, ADONIS provides an underlying meta modeling technology that allows users to define new modeling languages and mechanisms for domain-specific or customer-specific needs. Various pre-defined reference models, templates, and meta models are also available, including ITIL, CobIT, BS15000, SCOR, Six Sigma, SOX, and ERM. These are implemented as specific pre-built modules and templates designed for use with ADONIS for Sarbanes-Oxley, healthcare, knowledge management, e-learning, and other enterprise/industry initiatives.

ADONIS also integrates with other BOC toolkits and products, including the ADOscore Balanced Scorecard (BSC) toolkit, the ADolog SCOR implementation framework, and the ADOit IT architecture and services management toolkit.

**Table 1—Overview of ADONIS**

ADONIS Business Edition	Repository-based graphical process modeling and analysis tool for process design, process analysis, process documentation, and process implementation. Provides a comprehensive but easy-to-use modeling tool, as well as interfaces for collecting external information (e.g., processes, structures, and statistical data, etc.). Model import/export capabilities include XML and ADL (ADONIS Definition language) as well as various merge and update options. Uses query-based component for analyzing information stored in ADONIS repository. Publishing capabilities include Web and standard (Office) publishing in various formats. Web-based modeling supports using additional Web Services interface component (i.e., ADOweb).
ADONIS Professional Edition	In addition to all the capabilities provided by ADONIS Business Edition, ADONIS Professional Edition supports simulation, process evaluation, process monitoring, and controlling tasks. Features discrete event-based simulation with a library of 4 algorithms; allows comparison of analysis and simulation results, analysis of non-standard simulation results, and real-time data.
Integration Modules	Various add-on diagrams/interfaces available for ERP systems (e.g., SAP); BPM suites (e.g., IBM Websphere Workflow, Tibco Process Suite, MS BizTalk Server, Oracle BPEL Process Manager); XMI (e.g., IBM Rational Rose, Eclipse); and MDA approaches using the BMT (BOC model transformer).
Activity-Based Costing	Add-on module for process costing analysis (As-Is analysis and Should-Be analysis), including cost center evaluation.
Specific Modules	Specific add-on modules include SOX extension (Sarbanes Oxley solution based on COSO/ERM framework), ADOmed (healthcare), ADOegov (e-government), ADOorg (automated org charts generation from operational systems), PROMOTE (knowledge management), and ADVISOR (e-learning).
Pre-built Reference Models & Templates	ITIL, CobiT, eTOM/SID, SCOR, TOGAF.
Call Center and Workforce Management	Add-on for workforce planning for call centers based on business processes and statistical data from ACD machines.
ADOweb	Java-based Web Services interface (SOAP) that supports browser-based online modeling with ADONIS; also used to integrate ADONIS into portal applications and other BOC Management Office components; used to create BPM portals to provide single point of access to EA and process information.
ADOorg	Optional interface for importing organization information from operational systems such as HRMS (e.g., SAP, Lotus Notes, etc.) into ADONIS.
ADOscore	Supplemental product – object-oriented performance management and balanced scorecard toolkit. Facilitates implementation of steps involved in introducing BSCs based on Kaplan and Norton concept – from documenting strategic variables, goals, and performance indicators via the definition of target levels and thresholds, to analyzing and controlling levels and operational goals via the ADOscore Cockpit digital dashboard.
ADOlog	Supplemental product – framework for the design, simulation, and analysis of supply chains based on the Supply Chain Council's SCOR framework.
ADOit	Supplemental product – object-oriented IT toolkit for designing, modeling, documenting, and managing IT processes and IT architectures according to the ITIL and CobiT standards.



Typical ADONIS application scenarios include

- Business Process Optimization – continuous improvement of business processes (e.g., process simulation, conducting “as-is” and “should-be” comparisons, benchmarking, etc.)
- Organizational Management – organizational documentation, job descriptions
- Controlling – process cost analysis, business activity monitoring (BAM), and KPI management
- Quality Management – ISO 9001:2000 certification, Six Sigma, EFQM, CMM
- Process-based knowledge management and skills management (e.g., process portals, knowledge portals, etc.)
- Human Resource Management – workforce and resource planning, capacity management, and call center management
- Compliance Management – Basel II, Operational Risk Management (ORM), Sarbanes-Oxley (SOX), Enterprise Risk Management (ERM), Solvency II, and International Financial Reporting Standards (IFRS)
- Process-oriented application development – ERP systems implementation, integration with workflow and Web-based systems, MDA, BPEL, etc.
- Information Management – creating requirements definitions, specification documents for information systems, legacy migration, etc.

ADONIS is available in a wide range of human languages, offering extensive support for multi-national organizations.

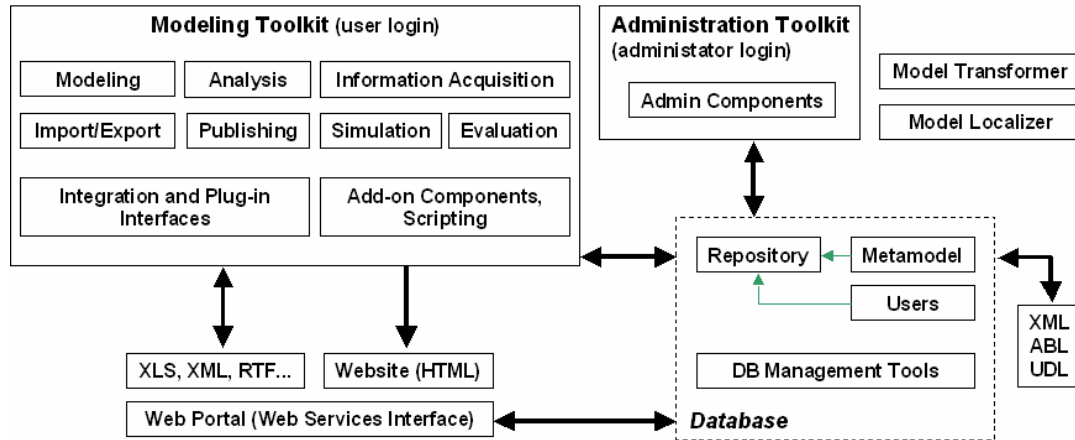
Overall, ADONIS is a well-designed tool that provides a functionality rich modeling and analysis environment behind a very intuitive and friendly UI. It is also very customizable – from the languages and frameworks it can support to its GUI and role-based user access and functionality tailoring capabilities.

## **2. Product Architecture**

### **2.1 Architecture Overview**

Figure 1 shows the ADONIS architecture, which consists of three main levels: the repository, the application components, and the user interface. Optionally, the ADONIS application server can be used to access the repository and the application components via the ADOweb Web Services interface, which supports browser-based modeling with ADONIS. ADOweb is also used to integrate ADONIS into corporate portal applications, and for creating “BPM portals” designed to provide a single point of access to corporate EA and process information.





**Figure 1. Overview of ADONIS Architecture.**

The ADONIS architecture supports XML import/export and scripting and plug-ins, allowing integration into existing customer specific infrastructures. All repository information such as configuration information (ABL proprietary format), user information (UDL proprietary format), and model information (XML) can be imported and exported between different ADONIS installations or to other environments.

ADONIS is separated into two toolkits: the administration toolkit and the BPM toolkit. The administration toolkit provides user administration, meta model administration, and configuration management facilities. The BPM toolkit provides the end-user application components. This division provides a clear separation of administrator and end-user tasks. All necessary components are directly available from a single UI within each toolkit.

### 2.2 Usability and User Interface

ADONIS supports general business users (i.e., managers) as well as more technical analysts. It features an intuitive GUI based on the MS Windows paradigm, and MS Office users should feel quite comfortable with its large number of functions and features. ADONIS also includes user-support features designed to assist users with modeling and analysis tasks, including

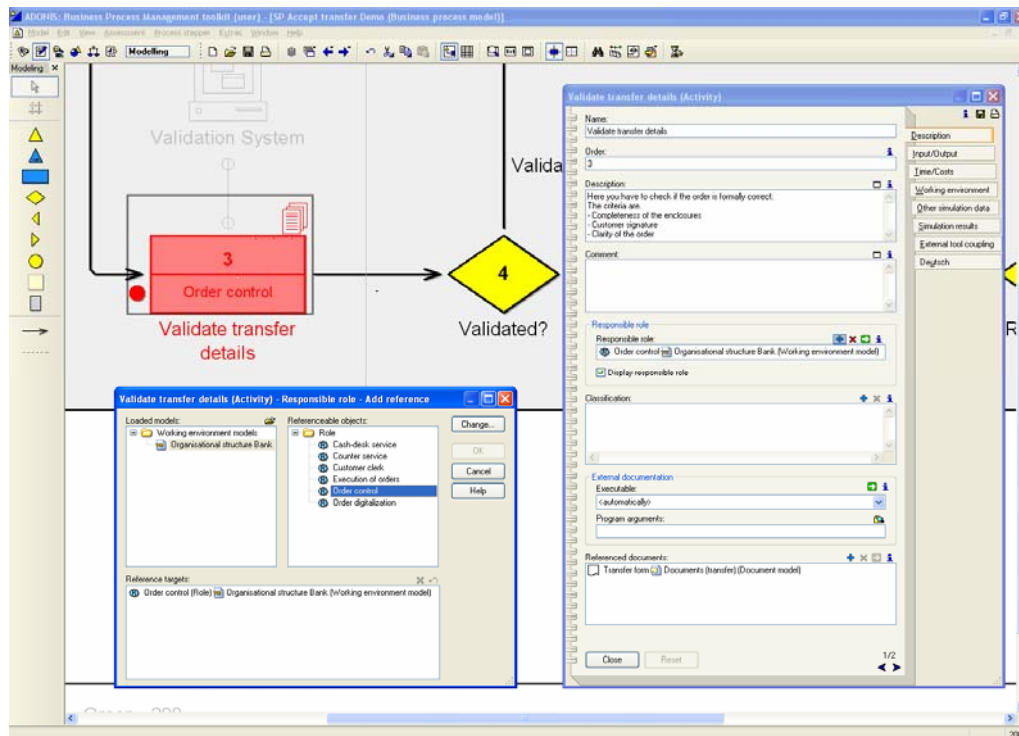
- Interactive framework picture – helps users choose relevant model types
- Methodology wizard – assists users in following a methodology
- Integrated help files (including on-line help as well as PDF files as printable versions)
- Embedded help on objects and attributes
- Context sensitive help

ADONIS features intuitive modeling facilities for creating and managing models. Model design features include the ability to drag-and-drop objects from the palette. A table view also provides a spreadsheet for users to display and edit the properties of each modeling object.

Each modeling object or connector has a specific set of attributes for capturing information. In the model editor, these attributes are shown via a property dialog box called “notebook.” Double-clicking on an object opens its notebook in which you can add detailed information in tabs and fields. Fields are not only simple text fields, as ADONIS supports many strongly typed attributes, including text, number, date, time, enumeration (simple/multiple selection), record, inter-reference, expression (user-defined formulae), and program calls. This range of attribute types provides considerable capabilities for structuring and formatting of information.

ADONIS's notebook paradigm provides users with a very powerful but intuitive way to manage process and process-related information. Notebooks are not only used to define detailed information about objects, but can also be used to navigate from one process to another process (by referencing an object in another model, for instance). Notebooks can also be configured to work like a filter to specific information (e.g, cost) or capabilities (read/write, etc.) in order to support specific users with varying levels of functionality and access to information. (Customization is usually carried out by an administrator by organizing the various tabs and fields in the notebook.) Figure 2 shows the notebook of an Activity object, with different chapters or pages. "How to use" explanations for the object or each of its fields are available by clicking on the blue "i" icon. The responsible role is documented by referencing an existing role from a working environment model.

ADONIS allows a large range of graphical representations – from geometrical shapes to any picture. Other shape properties include resizing, expand/collapse, auto-grow, and flexible text positioning. In addition, the tool supports complex graphical representations that embed customizable visualization logic, depending on attribute values (e.g, IF Activity has Input Documents THEN Display a document icon). This feature makes the tool particularly user-friendly; by displaying information stored in a notebook, users are afforded an at-a-glance view to a lot of information related to a model.



**Figure 2. Notebook, Object Selection and Reference Dialog in ADONIS.**

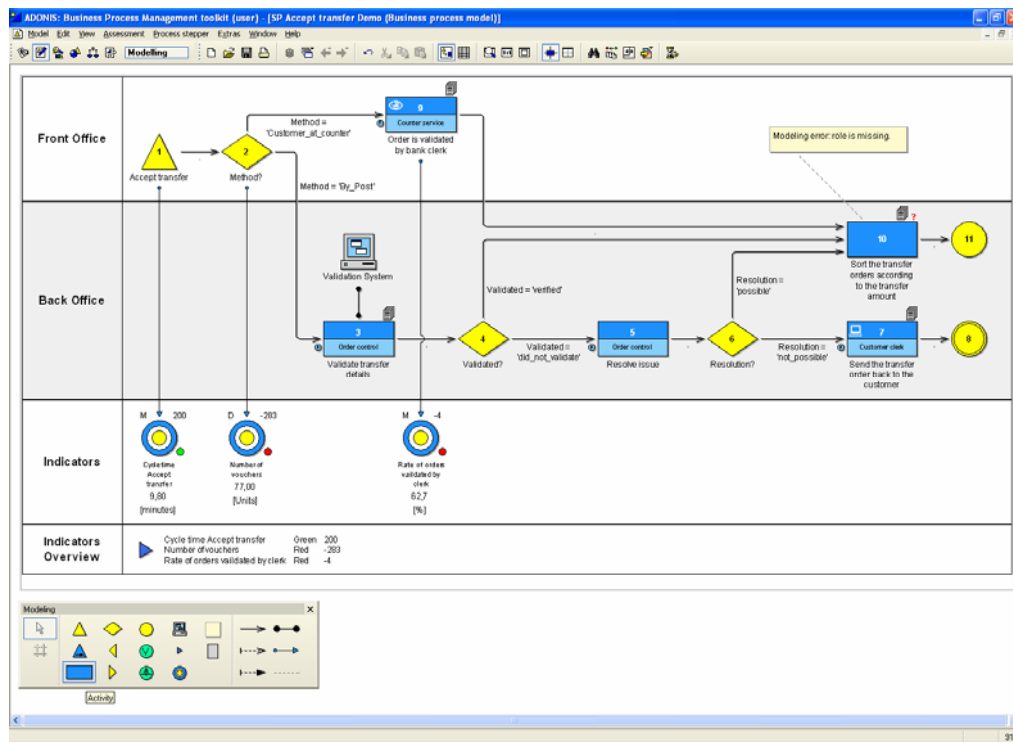
For documenting processes, ADONIS uses the swim lane paradigm for its workflow model. Users have the choice of using horizontal or vertical swim lanes. Other helpful features include an undo function, auto-save, and various user-friendly attribute types (e.g., list, radio buttons, check boxes, tables). Figure 3 shows a process flow model as well as KPIs displaying process-monitoring data from process execution environments. The modeling palette shows all available types of objects and connectors. You can display their names by highlighting them with the mouse.

Other notable model display features include a full-screen mode, zoom options, connector marks at page borders to ease working with large models, the ability to shrink or expand referenced sub-processes, and print preview with page setup.

The ADONIS model editor supports multi-page diagrams, movement of multiple objects, object alignment, automatic object numbering; automated positioning (via hierarchical positioning algorithms), and floatable windows and toolbars.

The ADONIS Model Explorer provides a number of features to support model navigation, including

- Model exploration – folder structure display, object and connector browsing within a model
- Model navigation – drill-down navigation with hyperlinks, a process stepper that “walks” the user through each step in a process, and path analysis
- Productivity-enhancing features – expressions for automated value definition, global change on attributes, and automated model generation



**Figure 3. Process Flow Model and Modeling Palette.**

Figure 4 shows the Model Explorer GUI and several models, including a process map, org chart with roles, and process model. The Model Explorer shows the folder structure that is accessible for the logged user, including write-protected folders and models. If a model/object includes a reference to another model/object, this reference can be shown in the model editor, and users can follow it by clicking on the hyperlink, for example, navigating to a sub-process.

ADONIS also offers various quality-enhancing features for enforcing compliance with modeling rules. These include “correct-by-construction” enforcement, valid and default values for attributes, semantic checking, and scripts for quality assurance.

ADONIS provides a rich set of functionality that allows you to tailor the tool to support different users according to their specific needs (e.g., roles, goals, languages, skills etc.). This includes a multi-lingual UI,

multi-lingual model and HTML documentation (e.g. language-specific attributes), and the ability to define end-user-appropriate notation and terminology.

Notable features for configuring ADONIS to support specific levels of users include

- Defining specific repositories dedicated to different user groups, with or without shared models.
- Exposing or hiding tool features, such as components, menus, toolbars, according to a specific user group.
- Defining specific information levels available to each user group (e.g., available model types, models, objects, attributes, etc.).
- Adding extensions – specific customization functions (scripts) that are available according to model-driven role-based permissions (e.g., validation workflow, publishing rights, etc.).

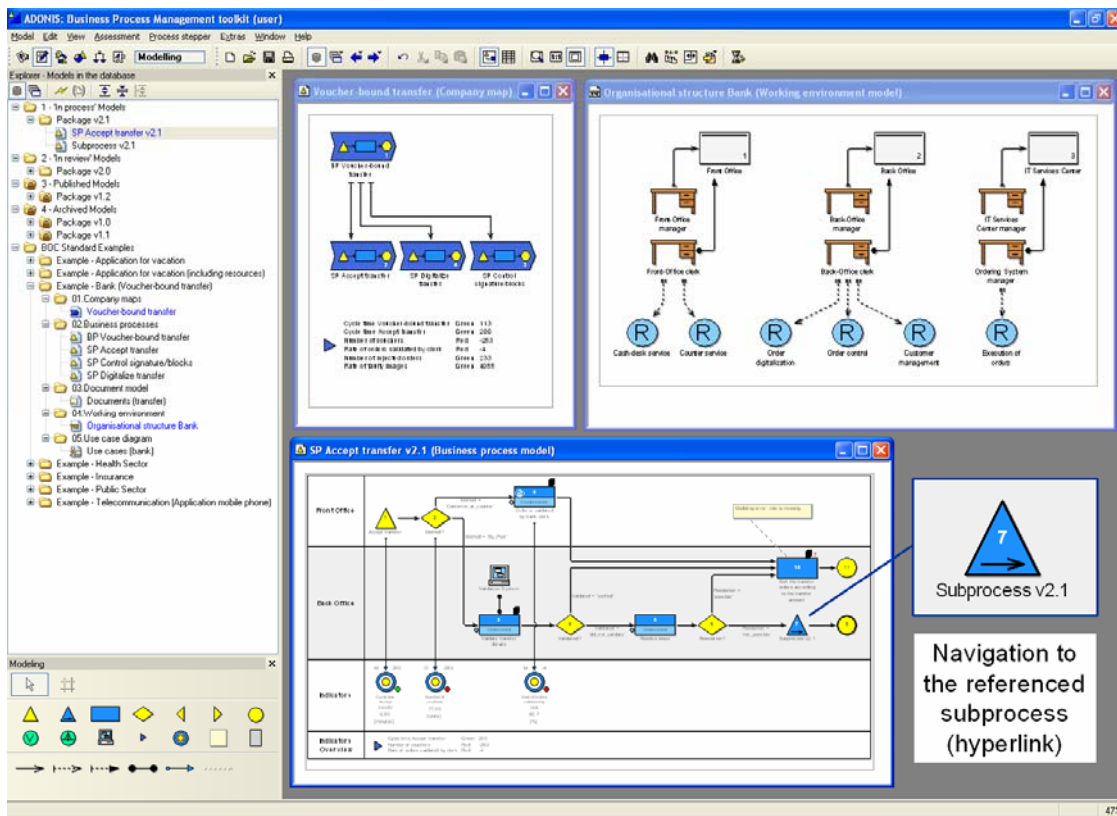


Figure 4. ADONIS Model Explorer GUI showing model types and model navigation.

The ADONIS administrator configures the tool via intuitive menus, which are used to hide or lock items according to specific end-user audiences. In this manner, each user is presented with a personalized environment that displays information relevant to their roles and needs.

ADONIS offers a number of features to cover various analysis requirements: standard queries, pre-defined queries, ad-hoc queries (supported by a wizard), search mechanisms, and cross-reference matrices. Queries involve models, objects, or attributes. Users can follow documented interdependencies (through inter-references or connectors), carry out impact analysis and get a comprehensive understanding of the system. Results of such queries are provided as tables. Another solution is to visualize analysis results as a model (e.g., service dependency model, etc.).

Finally, ADONIS offers extensive support for multi-national organizations, with versions available for English, German, Spanish, French, Italian, Greek, Polish, Hungarian, Czech, Russian, Bulgarian, and Romanian languages.

### **2.3 Repository Options/Team Development**

ADONIS is a repository-based tool. The repository can reside on IBM DB2, Oracle, and Microsoft SQL Server databases.

ADONIS supports multi-user workgroups in several ways. In addition to the ability to publish models to the Web, the ADOWeb interface provides Web-editing of ADONIS models (but in a more limited capacity than is available using the full client-server version). You can also integrate ADONIS into corporate portal applications using ADOWeb.

ADONIS uses a file-based directory system (versioning numbers, etc.) for managing models; folders in directories have (assigned) different access rights based on user-assigned roles and privileges. A model comparison utility is also available for comparing different versions of models in the ADONIS repository.

ADONIS also integrates with Concurrent Version Systems (CSV) and other external Document Management Systems (DMS) that provide check-in/check-out capabilities. Such configurations are typically used for large projects involving multiple environments (IDEs, CASE tools, etc.). More sophisticated version management capabilities (than those found in the standard ADONIS package) are available through customization of ADONIS's version management and model-tracking capabilities.

### **2.4 Integration with Other Products**

ADONIS offers various capabilities for integrating with third-party tools and applications, including

- Link or program calls without data exchange – attributes in the notebook or functions in menus that can link and open an external program with given launch parameters (e.g., opens IBM Rational ROSE with the corresponding MDL/XMI file).
- Interface for data exchange. Implementation is done with ADONIS API (i.e., AdoScript) or with one of the multiple import/export formats supported by the tool, which include: XML, XMI, XPDL, BPEL, FDL (IBM Websphere), XFR (TIBCO Process Suite), Text, CSV, XLS, RTF, DOC, and PDF.

ADONIS offers direct integration with the following third-party tools and applications:

- BPM/EAI/Workflow platforms: Microsoft BizTalk Server, Oracle BPEL Manager, IBM Websphere Workflow, TIBCO Process Suite, and DOMEA
- IDEs and CASE tools: IBM Rational ROSE, Eclipse, and MS Visual Studio Team System
- Enterprise Content Management Systems: PC DOCS (ODMA) and Lotus Notes
- GroupWare: Lotus Notes (NotesCall) and MS Project (Microsoft Sharepoint Team Services).
- Simulation tools: ARENA
- Drawing tools: MS Visio

## **3. Analysis and Process Modeling**

### **3.1 Enterprise and Organization Models**

#### **Enterprise Architecture Models**

ADONIS supports a number of EA frameworks including Zachman, TOGAF, DoDAF, NGOSS, and OSSAD. BOC also offers pre-built libraries for special frameworks (e.g., LOVEM) or guidelines on how to use ADONIS and other BOC products for a given framework.



Concerning EA framework (and methodology) support, ADONIS is very extensible. ADONIS is based on a meta modeling technology that provides a very flexible architecture (meta meta model) and meta model design tools for customizing or designing any type of EA framework. All framework configurations are stored as libraries, and can be managed with other available libraries via the “Library Management” component of ADONIS administration toolkit. (See Sections 2.2 and 4.1 for more on ADONIS’ customization features.)

### **Organization Models**

ADONIS provides modeling capabilities for depicting organization charts and for documenting organizational units, actors, and roles. Further documentation attributes include skills, presence, and availability. These various elements can also be referenced from the process model and linked to swim lanes, processes, activities, or any potential object. These links are very important for reporting issues based on cross-references (e.g., role-activity matrices, org unit-process matrices, etc.).

BOC also provides, with its optional ADOorg product, an interface to get current information related to the organization from Human Resources Management Systems (HRMS). This interface automates the management of nested organization charts by enabling

- Data collection from SAP HR module or other systems
- Automated model generation and import mechanism with updating facilities
- Automated generation of hierarchically structured charts
- Documentation and aggregation of HR metrics

### **Resource and Cost Modeling**

ADONIS supports modeling of any resource involved in the process execution. Costs can be defined for each resource and used during simulation for personnel or equipment cost calculations. Schedules are documented using an attribute of type “Calendar,” which stores input data for workload analysis. (See Section 3.4 for more on simulation). Resources can also be shared and allocated to activities of a process.

Users can also adapt the “Resource” object to specify a large range of resource categories with optional graphical symbols – examples include plane, truck, warehouse, production plant, etc.

### **Mapping Organization Strategies to Performance Measures**

ADONIS supports documenting performance strategy and goals, and mapping organizational strategies to processes and performance measures. For example, ADONIS process models show indicators that can be documented with current and target values that lead to a score calculation. (This capability supports process monitoring as well).

BOC also offers several supplemental products for representing items related to strategy or performance in process models. ADOit features a meta-model that includes the following modeling objects: “Strategy,” “Goal,” “Project,” and “Indicator.” Relations between these objects allow users to map strategies to KPIs. Typical applications encompass IT governance, business-IT alignment, and IT project controlling. Processes in ADOlog include attributes to store values for SCOR-KPIs. In addition, ADOscore provides models and automation mechanisms designed specifically for configuring BSCs, defining initiatives, collecting metrics, aggregating indicators, and for publishing dashboards via a Web-based controlling cockpit.

### **Managing Process Portfolios**

Once KPIs or other information (e.g., maturity level) are documented in the “Process” object, ADONIS’s analysis component allows users to filter process portfolios – for example, per org unit, per business domain, or per process owner, and so on. On the model management level, users can set up a practical folder structure to organize models into folders corresponding to specific portfolios. A graphical visualization of the portfolio is also possible using process maps.



### 3.2 Defining Processes

#### Defining Processes

Processes are described graphically as well as in a notebook. Process information is documented in attributes of the “Process” object, and as a model that graphically depicts a sequence of activities, with control or information flows.

Users can consider a number of documentation views including: functional (activities, sub-processes); organizational (actors, resources); dynamic (sequence, flows); content (artifacts, products); quantitative (times, costs, and other metrics); and context-oriented (version, variant).

ADONIS offers visualization modes to select which items in a model should be visible or not in order to provide better visibility of the models. This is important, because in some cases, trying to display all views in a particular model is inappropriate. For example, system integration projects typically require a description of the same process from a business perspective and a technical perspective. While the notation for the business perspective has to remain extremely user-friendly (e.g., focusing on organizational issues), ADONIS can be tailored to provide a suitable notation for the technical perspective (i.e., related to Use Cases of IT systems [BPM, Workflow, ERP etc.]).

#### Process Information Storage and Integrity

All information is stored in the ADONIS repository. Mechanisms for integrity management include access-rights, permissions, and locking mechanisms. (See Section 9 for more about system administration and security.)

#### Graphical Notations

ADONIS supports a range of pre-defined graphical notations, importable as libraries or model types, including ADONIS (proprietary), BPMN, UML 2.0, LOVEM, EPC, and OSSAD. ADONIS can also be customized to support any graphical notation. (See Sections 2.2, 3 and 4.1 for more on customization.)

A model transformation utility is also available. For user groups working on the same process but using different modeling notations (e.g., ADONIS Standard vs. BPMN, etc.), the BOC Model Transformer provides automated transformation of models from one particular notation to another. It also provides visualization options to view a model using a selected notation.

ADONIS supports all elements and attributes (“Complete Element Set”) of the BPMN 1.0 specification. Thus, BPMN processes can be created, analyzed, simulated, documented, and published using ADONIS.

In ADONIS, UML 2.0 fulfils the “Compliance Level Complete (L3)” – all 13 diagram types with all notation elements are implemented in compliance with the standard. The structure diagrams allow for an illustration ranging from class structures to the structuring of whole systems and architectures. You can also display the sequence of actions between static parts in various ways using behavior diagrams.

### 3.3 Subprocesses and Activities

#### Handling Subprocesses and Activities

ADONIS supports any number of nested levels of decomposition. Users can easily navigate decomposition diagram hierarchies via hyperlink or by clicking on the symbol. Starting from a process map, a “Process” object may reference

- A process map, with a decomposition into subprocesses
- A process model with a sequence of activities, including references to other processes

If a lower granularity is required, users can link procedures or work steps to activities as external documents.

### **Defining Activities**

Activities in ADONIS are used to graphically describe which tasks are executed within a process. Because they can link many elements of an EA framework together (e.g., links to roles, applications, documents, etc.), activities are key modeling objects. Activities in ADONIS contain necessary information related to different views (See Section 3.1).

### **Documenting Decision Rules**

Rules that alter a process sequence are captured and depicted through logical operators, objects, or connectors as is appropriate to the notation used. Transition condition and probability are documented for each branch of the process. (See Section 3.4 for more on simulation). Rules/events that do not alter a process sequence can be either documented within attributes of the activity or shown as separate objects in the model.

### **Rules Entry**

See above.

### **Activity Costs, Resources, and Time Data**

In ADONIS, each process, subprocess or activity object offers several standard attributes to store cost, resource, and time data. User-defined metrics can be added via customization. This information can also be used for simulation purposes. A bottom-up aggregation of this data from individual activities to the whole process, through all decomposition diagrams, provides metrics on the higher description levels of the processes.

Various approaches for calculating costs are possible, allowing users to perform complex activity-based costing (ABC). The optional ABC module supports As-Is and Should-Be analysis. Typical results include resource costs, personnel costs, and activity costs. These results can be mapped to processes, organizational units, or cost centers.

## **3.4 Simulation**

### **Simulation Capabilities**

ADONIS's simulation component is directly integrated within the tool and provides discrete, event-based simulation. A simulation library is included that provides four simulation algorithms as well as animation and playback capabilities.

### **Path Analysis**

Path analysis simulates a business process without taking the working environment ("resource model") into account. Results include times (e.g., cycle time, execution time, etc.) and costs of the business process, as well as details for each specific path that can be chosen within the process. A path analysis gives the opportunity to calculate the amount of personnel needed for a process. Using path analysis, the critical process path can be determined and every possible path in the process model can be analyzed regarding its frequency, execution time, cycle time, and resource costs, etc. Results are displayed in spreadsheet as well as graphically (i.e., in charts as well as directly in the process flow). The results of a path analysis provide a basis for determining process weaknesses (e.g., activities rarely executed, paths with very long cycle times, etc.) and offer an overall picture of the business process.

### **Capacity Analysis**

Capacity analysis simulates one or several business processes, taking into account the working environment of the organization. In addition to the results of the path analysis, the workload, personnel costs, and the personnel capacity required are also calculated. By simulating the processes in different working environments the implications of different scenarios can be modeled and analyzed.

### **Workload Analysis**

Workload analysis simulates one or several business processes within a given working environment model. Using a process calendar, the likelihood of a new process being started is defined (often this kind

of information can be obtained from EDP supported applications – e.g., the call routing server of a call center – and may be imported via the ADONIS XML interface). For each employee, his/her availability is documented in an employee calendar. Results of workload analysis simulations enable users to determine the dynamic waiting times that occur during process simulation (e.g., due to a lack of resources, etc.), thus allowing you to identify bottlenecks in processes and to schedule an optimum utilization of the existing (personnel and material) resources. Bottlenecks are easily visible with the use of animation while process simulations are run. Two different types of workload analysis are available: one is based on the number of processes to simulate; the other on a fixed period of time (e.g., 1st - 30th June).

The inter-arrival times of processes and the resource calendars are described by statistical distributions such as normal, exponential, uniform, and discrete. The process flow is described by transition conditions (business rules). Complex transition conditions can be defined by composing simple conditions using AND, OR, and NOT operators. All statistical information such as times, costs, probabilities, conditions, and so on, can be either directly inserted within ADONIS or imported from external spreadsheets or via XML. Simulation input data is analyzed for consistency before execution of the simulation model – for example, to check the likelihood of all transition conditions at a decision point to be 100%, or to check the structural consistency of the business process models and working environment models, etc.

#### **Analytic Capabilities**

ADONIS uses a flexible process simulation meta model. Thus, it can simulate business process models regardless of their underlying modeling language or notation (e.g., BPMN-based models can be simulated). ADONIS also integrates with third-party simulation engines (such as Arena) via its XML interface.

Simulation results can be stored within its corresponding input models and further analyzed using the ADONIS evaluation component. This allows evaluations such as “Provide all business processes with a cycle time greater than two weeks.” (See Section 2.2 for more on ADONIS’s analysis capabilities.)

#### **Real-time Data Utilization**

ADONIS’s simulation component does not support receiving real-time data feeds or interaction with operational systems during a simulation (i.e., ADONIS can import data from operational systems before a simulation but can not receive data once the simulation is begun).

#### **Model Distribution and Simulation on Enterprise Networks**

ADONIS does not support simulation of models from different repositories distributed across a LAN. Rather, all simulated models must reside in the same repository.

#### **Statistical Fit/Data Analysis**

See above.

#### **Capture and Reporting of Simulated Metrics**

Simulation results are displayed in spreadsheets and, graphically, in charts, as well as directly in a process flow. Using ADONIS’s publishing component, all simulation results can be made available in an organization via Intranet or email.

## **4. Business Process Methodologies**

### **4.1 Business Process Methodologies**

ADONIS does not enforce any specific modeling methodology. Rather, it is designed to support whatever modeling approaches the user desires, based on standard components like Acquisition, Modeling, Analysis, Simulation, Evaluation, and Import/Export. Thus, ADONIS can be tailored to

reflect these and other methodologies, with a specific repository structure, customized functions, and additional components. (For more on customization see Sections 2.2 and 3.)

Examples of supported methodologies include

- Process Improvement: Six-Sigma, ISO 9001:2000, TQM, ITIL.
- Process Re-engineering and Transformation: LOVEM and NGOSS SANRR (i.e., Scope, Analyze, Normalize, Rationalize, and Rectify).

#### **4.2 Six Sigma Support**

ADONIS's general capabilities can be applied in the context of the DMAIC and DMADV cycles to support Six Sigma efforts. BOC consultants can provide guidance to set up all conventions for a Six Sigma project with ADONIS. With business modeling and simulation and evaluation mechanisms, ADONIS offers model-driven solutions for several Six Sigma applications. The ADONIS import/export component allows data exchange to MINITAB or JMP statistical analysis tools via MS Excel spreadsheets or CSV files.

### **5. Report Generation and Document Management**

ADONIS supports various formats for exporting repository content, including

- Text documentation of object or query results (XLS, CSV, TXT, HTML)
- Model graphics (PDF, BMP, JPG, EMF, PNG, PCX, SVG)
- Model information: XML, SGML
- Model information and graphic: HTML, RTF, Word, and PDF

Publishing functionality includes HTML document generation (which can be tailored to client-specific needs). Thus, users can obtain a generated website that meets their intranet/extranet layout requirements. Reports are available for a single model, a model list, or a model hierarchy (e.g., all referenced models). Other options include various layout settings, format profiles, and the application of filters on objects or attributes. You can also print models directly, and ADONIS offers enhanced features, including print preview, layout setting, or scale selection.

ADONIS offers document management capabilities ranging from a simple link to a complex interactive solution. For example:

- Embedded picture – models can embed pictures as background illustrations or as a graphical representation of modeling objects.
- Linked document – the ADONIS notebook has a typed-attribute called “ProgramCall” that lets users easily link to any type of document (e.g., videos, presentations, procedures, etc.). This attribute takes two parameters: a file-system path or a URL, and the program's name that should open the file. For example, this feature could be used to enter the URL of documents stored in a document management system (DMS). If necessary, referenced documents can be attached to the generated Website and included in the HTML package.
- Modeled document – the modeling of documents used means they are more easily managed by making them less abstract than links and by applying all analysis facilities of ADONIS to them. For this reason, ADONIS provides a modeling object called “Document,” used to specify meta data of the document (e.g., keywords, responsible person, and last update). This allows users to get a better overview of documents, display a documents map, and visualize icons of the document's type (e.g., Word, PowerPoint, Excel). It also provides a hyperlink or a file system link to directly open the document in ADONIS.

Related features in the process model:

- An icon is displayed on “Activity” objects to show when documents have been attached
- A list of input/output documents can be displayed close to the object referencing them, with navigation capability via hyperlinks

BOC has implemented solutions to integrate ADONIS with DMSs (e.g., PC DOCS). Users can directly link documents stored in the DMS, open these documents in ADONIS, and get meta data from the DMS to fill attributes in the document’s notebook. Links to DMS documents remain available on the generated Website using plug-in technology.

ADONIS also integrates with Lotus Notes. This includes import/export of data between both tools and the ability to reference/open Lotus Notes documents from ADONIS.

## **6. Development Environment**

### **6.1 Language of Tool**

ADONIS is written in C++, with add-on components in C and Java. Other languages used include XML, XSLT, SGML, DSSSL, and SQL. ADOweb is written in Java.

### **6.2 Product Support, Maintenance, and New Versions**

Minor versions (e.g., patches and minor functionality extensions) are delivered approximately every 4-6 months. Major versions featuring major functionality extensions are delivered approximately every 18 months. Both minor and major versions are delivered via CD and email.

## **7. Software Modeling and Code Generation**

ADONIS supports business-driven software engineering with a number of modeling and reporting features that can generate comprehensive project documentation. Various model types or concepts can be added to cover project specific needs and to ensure integration of business process models with the corresponding technical models.

ADONIS also exports XMI files to CASE tools and IDEs with software code generation capabilities. Typical benefits are enhanced use case descriptions, comprehensive risk/impact analysis, and a better introduction of the system to its users.

ADONIS assists users in many activities of a software process, especially for business modeling or requirements of engineering disciplines and for the transition phase. ADONIS can also support different software process improvement approaches such as

- CMMI - SCAMPI (Standard CMMI Assessment Method for Process Improvement)
- ISO 15504 / SPICE (Software Process Improvement Capability determination)

Software models:

- Add-on library with all UML 2 diagrams, or an extension of the customer’s library with some UML diagrams. Customers may purchase the whole library (consisting of all 13 diagrams), or ask for 1-2 models (typically use-case or class diagrams) to be integrated into their existing library. The first option is for the customers who want full UML-compliant modeling capabilities. The second is for customers who just want to bridge the gap between business and IT while integrating both business and UML models.
- XMI import/export.
- ADONIS integrates with Eclipse via XML.

Workflow models and code:

- BPMN, tool-specific notations (IBM Websphere, MQ Workflow, Tibco Process Suite).
- Export: BPEL (e.g., Oracle BPEL Process Manager); Import/Export: XPDL, FDL (IBM Websphere Workflow), XFR (Tibco Process Suite).
- BPEL code can be generated from BPMN models or models using other another notation (e.g., ADONIS Standard Notation).
- API-based code generation for MS BizTalk Server.

### **7.1 UML Model Generation**

As indicated above (see software models), ADONIS offers three levels of support for UML: modeling, XMI generation, and transforming business-level models to UML models (e.g., MDA approach, BMT).

### **7.2 BPEL Generation**

ADONIS generates BPEL code from BPMN models or models using other notations. It supports the complete range of modeling levels, from the business side and optimization through to the technical realization. This integration has been demonstrated through a coupling with Oracle BPEL Process Manager.

## **8. Templates and Frameworks**

BOC offers several products, including those designed to integrate directly with ADONIS's modeling functionality, as well as separate pre-packaged solutions that incorporate horizontal and vertical templates and frameworks.

BOC has built capabilities in ADONIS that enable it to expose templates or frameworks in a variety of ways, including

- Pre-built repository structure (new library/product/product configuration)
- Repository extensions (extensions of an existing library, shapes, etc.)
- Pre-built models with linked documentation (e.g., ITIL, BSC, SCOR documents, etc.)
- Pre-built reporting tools (e.g., SOX)
- Pre-configured tools for semantic-checks and correct-by-construction modeling

BOC offers the following pre-packaged and customized solutions:

- ADOscore (BSC), ADOit (ITIL), ADOlog (SCOR), and PROfit (ISO 9001:2000 and other quality standards).
- Various configurations of ADONIS: ADOmed (Healthcare) and ADOegov (Public Administration).
- An importable package of pre-built models: ITIL, CobiT, CMMI, eTOM/SID/TAF, MOF, SPICE.

BOC also offers services to extend a customer's product to support Six-Sigma, SOX, and Basel II.

Balanced scorecards and metrics definitions are also available for ADOscore for banking, healthcare, and IT.



## 9. Systems Administration and Security

ADONIS provides advanced features for security management, user administrations, and repository/model management.

### Security Management

User authentication. ADONIS supports the Single Sign On (SSO) protocol that offers unified login and advanced security for user authentication and password management.

Information confidentiality. Administrators can control access (no access, read-only, full access) to information captured in models according to defined user profiles. Facilities for filtering object types and their attributes before publishing the models supports the selection of any published information.

Data storage. Database backups and security policies defined by the IT department can be applied to the ADONIS repository. Another way to secure data is to export the models as XML files, which could be periodically stored in external archiving systems (e.g., CVS).

### User Administration

User administration includes user groups, users, and user profiles. Users and domains can be imported from LDAP directories (Windows Active Directory). Administrators use the ADONIS administration toolkit, which offers intuitive menus to define user profiles and workspaces that specify access rights, permissions, and available libraries or components.

### Model Administration

Each model has meta data that is entered by the modeler (e.g., table with change history, keywords, etc.) or automatically provided by the system (e.g., last user, date of last modification, etc.). Other coordination features include objects for information exchange (e.g., note) and teamwork attributes (e.g., To Do list, Open Questions field, etc.).

Each model has a version number. ADONIS supports any complexity level for version management, regarding version number policies (e.g., policy for minor or major versions) or model status strategies (e.g., workflow for reviewing, validating, publishing, archiving, etc.).

Some end-user organizations require enhanced change and history management capabilities. ADONIS can be customized with scripts (AdoScript) that generate audit-trails listing all changes.

## 10. Scalability

ADONIS can scale from a single user to hundreds of users and enables the management of a shared repository across organizations and locations. It can be deployed stand-alone; client-server or in thin client-server configurations. Different deployment variants support low-bandwidth networks with only tens of kilobytes in a WAN up to high-speed networks within a LAN or Intranet.

Some projects require both stand-alone and client-server configurations, for example, when external consultants also work on models. For such cases, ADONIS offers import/export facilities, locking mechanisms, as well as model consolidation features to ensure the integrity of stored information.

Once validated, models and their documentation can be published as Web pages, exported from ADONIS as a separate HTML files package, and distributed among organizations via intranet/extranet.

Scalability also refers to languages and variant management. BOC has developed multilingual features for the ADONIS GUI and models. On the model level, users can access language-specific attributes directly in the notebook and can choose to visualize the model in the required language. ADONIS supports complex variant management, for example, in the case of product- or country-specific processes/activities. BOC identifies three variant levels:

- Model – each variant is described in a specific model; navigation from the global model to specific models is achieved through model pointers and hyperlinks.
- Object/Path – each variant is represented on the same model using variant-related objects and paths.
- Attribute – each variant is documented in the notebook using tables or language-specific attributes grouped by tabs.

ADONIS supports simulation of complex processes, for example, with several hierarchical sub-processes, linked to large working environment models (organizational diagrams with roles and actors). The same business process models can be simulated related to different working environments without changing the models, just by combining them with so-called application models (i.e., simulation packages), saving considerable time in model building.

## 11, Platforms

ADONIS's client application runs on Windows NT 4.0 (SP6a), 2000, XP Professional/Home. ADONIS is also compatible with leading terminal services technology (e.g., Microsoft, Citrix). Repositories are hosted on Windows NT 4.0 (SP6a), 2000, 2003, XP, HP-UX, AIX, Solaris, and Linux servers. *ADOnweb* runs on Java-based and J2EE environments.

## 12. Pricing

ADONIS distinguishes between stand-alone licenses (“named use” licenses) and multi-user licenses in a client-server environment (“concurrent use” licenses). Concurrent user license means that organizations can install ADONIS on an unlimited number of client computers, but only the maximum number of purchased licenses can connect concurrently to the ADONIS database. Furthermore, two functionality sets are distinguished: the ADONIS Business Edition contains modeling, analysis, import/export, publishing, and administration components; ADONIS Professional Edition contains the following additional components: information acquisition, simulation, and evaluation components. All license information is configured and centrally stored via license numbers in the ADONIS repository. Site licenses and group licenses are also available.

Licensing for ADONIS Business Edition starts at 2.100,00 EUR; ADONIS Professional Edition starts at 2.700,00 EUR. Because ADONIS multi-user licenses are “concurrent use” licenses, typically at least two users can be covered by one “concurrent use” license.

- 8 users-configuration for 16.000,00 EUR achieved with 4 “concurrent use” licenses for ADONIS Professional Edition and 1 ADONIS server license
- 32 users configuration for 48.400,00 EUR achieved with 16 “concurrent use” licenses for ADONIS Professional Edition and 1 ADONIS server license

## 13. Company, Product Positioning, and Support

### 13.1 Company Background Information

BOC was founded in 1995 as a spin-off of the BPMS group of the Department of Knowledge Engineering at the University of Vienna. BOC is privately held and is headquartered in Vienna, Austria, with subsidiaries in Berlin, Madrid, Dublin, Athens, Warsaw, and Vienna.

BOC has emerged as a worldwide consulting and software firm specializing in strategy management, BPM and IT management. It has over 130 employees working in platform and product development,

technical support (40%); consulting services, customer projects and sales (50%); and training and seminars (10%).

BOC's customer base includes more than 500 customers worldwide. The company has experienced steady growth since its formation, reaching an annual turnover of 12 million Euros.

Since its inception, BOC has been strongly committed to R&D and innovation in the field of IT-based management approaches. It is involved in national and international research projects and presents papers at relevant scientific conferences and workshops. Well-known BOC research results are the Business Process Management Systems paradigm (BPMS) and the Enterprise Model Integration approach (EMI).

### **13.2 Positioning**

BOC has positioned ADONIS to support the full range of EA modeling and business process change activities, including

- Enterprise architecture modeling and analysis
- Process modeling and analysis, redesign, and improvement
- Detailed process modeling and analysis
- IT support/software development
- Human performance improvement initiatives
- Development of management and measurement systems

BOC has made a considerable effort to provide the features and functionality necessary to position its product to support the full spectrum of EA and BPM needs. In short, ADONIS is a very well thought out tool that provides powerful, feature-rich modeling and analysis functionality behind a very intuitive and user-friendly interface. It is also very customizable, from the languages and frameworks it can support to its GUI and role-based user access and functionality tailoring capabilities.

When used in conjunction with other BOC Management Office offerings (e.g., ADOscore, ADOlog, ADOit, etc.), ADONIS offers a very capable platform – based on a common meta model design – that supports business process modeling, enterprise architecture, IT architecture, and component analysis and systems design efforts. While its simulation capabilities support detailed process modeling and analysis. The addition of various frameworks and methodologies – including Zachman, TOGAF, DoDAF, Balanced Scorecard, etc. – make it well suited for supporting human performance improvement efforts and developing management and measurement systems. Finally, the pre-built reference models and templates offer organizations a practical means for jump-starting their EA and business process initiatives.

### **13.3 Product Training**

BOC provides consulting and training support services delivered on site or at BOC offices. Training covers BOC products, including end-user training and administrator training classes, and use of methodologies and approaches such as process costing and controlling, process management, strategy management, risk management, and service management. Classes are offered in local languages. Services also include the preparation of documents such as operations manuals or modeling guidelines.

### **13.4 Business Process Consulting**

BOC's consulting services focus on industry verticals such as financial services, IT service providers, healthcare, public administration, trade, manufacturing, and logistics.

BOC offers various consulting services and workshops for EA and business process consulting. These include methodology workshops, project support in process definition, process analysis, process implementation, strategy management, introduction of information systems such as ERP systems or

workflow systems, project assistance, and project management. Technical consulting services offered include product customization, integration of BOC's products into customer-specific infrastructures, and interface development.

#### **14. Case Study: ADONIS at Telefónica**

Telefónica is a world leader in the telecommunications sector, with market presence in Europe, Africa, and Latin America. It ranks third in the sector worldwide in terms of market capitalization and has over 100 million customers in a potential market of 500 million. Telefónica is also one of the integrated operators with the largest percentage of its business outside its home market and a reference point in the Spanish and Portuguese speaking markets. Telefónica's business activities cover fixed telephony and broadband, mobile/cellular telephony, business solutions, Internet access and content, and other business lines (e.g., guides and directories, contact center services, and content production, etc.).

##### **The Challenge**

The main challenge for Telefónica was to create a common language for business process modeling to facilitate and improve communication between departments, including communication of corporate strategy. Another key challenge was the introduction of a horizontal business organization, involving end-to-end processes, instead of the existing vertical (departmental) approach.

Telefónica required a BPM tool that could support its specific methodology and depict the company's "reality" in a way that would provide easy-to-follow process documentation. In addition, BPM and standardization should allow Telefónica to control and manage the processes efficiently, thereby becoming more proactive in the future. Prior to the selection of ADONIS, Telefónica evaluated different tools regarding their functionality, usability, and pricing. Telefónica settled on ADONIS, purchasing a group license that supports an unlimited number of licenses for all companies belonging to the Telefónica Group.

##### **BOC's Involvement**

BOC is a strategic partner of Telefónica, and its consultants have participated in various projects within the Telefónica Group. Initially, BOC supported Telefónica by designing a meta model for process management, according to customer-specific requirements. In a second step, BOC customized ADONIS to implement the specific meta model and other specifications sought by Telefónica. Additionally, handbooks explaining Telefónica's BPM methodology were created to facilitate both EA modeling and company-wide understanding of the models. BOC also provided Telefónica with advanced training on BPM concepts and ADONIS features to ensure a resource-effective application of the tool. The successful implementation of ADONIS in the main companies of the Telefónica Group in Spain, such as Telefónica Móviles, was followed by an additional rollout in Latin American companies. BOC also helped Telefónica deploy ADONIS (and trained Telefónica employees) in several additional countries, including Brazil, Chile, Peru, Argentina, Mexico, and the Commonwealth of Puerto Rico.

##### **Results and Benefits**

Telefónica has benefited from using ADONIS in various ways. First, ADONIS helped Telefónica to devise (and follow) a single procedure for its BPM projects, whereby processes are analyzed and redesigned, while business functions are defined and then assigned to processes. Next, the organizational structure is depicted (org charts), and the most appropriate systems are selected and implemented. The responsible persons approve models before publishing them as RTF or HTML documents. In the final stage, process indicators are monitored and evaluated to complete the process lifecycle and achieve continuous improvement.

Telefónica has modeled nearly all of its relevant business processes (including process maps, org charts, and process models); the repository contains about 20,000 models managed with ADONIS. As a result, Telefónica has gained better knowledge of its operations across the entire group. This allows best

**BOC GmbH****ADONIS, Version 3.81**

practices consolidation and sharing, especially for specific critical areas. ADONIS has also made it easier for Telefónica to get process certification according to the ISO 9001:2000 standards by integrating different quality management systems.

ADONIS models are shared via the company's intranet. Thus, all employees may browse published models and get up-to-date information about Telefónica's operations, process accountabilities, or their roles within the value-chain. Relevant documents for each process step and information regarding systems are also published to ensure comprehensive understanding of the processes and facilitate efficient knowledge management.

Telefónica has also carried out additional projects with BOC to develop solutions for Sarbanes-Oxley compliance, advanced KPI management, and extended publishing capabilities.

## **15. Company Offices**

BOC markets and supports its products globally through a combination of its own resources, complemented by a network of business partners. BOC is represented by many regional offices throughout Europe. These are located in Athens, Berlin, Dublin, Madrid, Vienna, and Warsaw. Corporate Headquarters are in Vienna, Austria.

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# SIMPROCESS

Version 4.2

## CACI, Inc.

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## 1. Product Overview

SIMPROCESS is a business process modeling and process simulation tool that supports process analysis, reengineering, process monitoring, business performance prediction, and continual process management.

SIMPROCESS makes extensive use of Java and XML technologies, providing non-programmers with a library of pre-built blocks used for assembling logic-based business models and simulations. SIMPROCESS's underlying language allows experienced programmers to add their own logic for custom model development and simulation.

SIMPROCESS spans two market areas – simulation and process modeling – and supports enterprise architecture initiatives. It is positioned to provide top-level analytical support as a stand-alone analysis tool, in combination with other methodologies, or it can be embedded or integrated with custom or commercial applications.

Table 1 provides an overview of SIMPROCESS's major features. SIMPROCESS combines discrete event simulation, process mapping, flow charting, and ABC (activity based costing) in a single package. SIMPROCESS is available in four different versions, each of which provides varying model building and simulation capabilities. This report considers SIMPROCESS Professional Edition. In addition to an advanced simulation engine, which provides animation and playback capabilities, SIMPROCESS includes various tools and facilities for optimizing, analyzing, and displaying models and simulations. SIMPROCESS also offers various database options and several pre-built models and templates as well as the ability to interface with software design and development environments.

**Table 1. Overview of CACI Offerings**

SIMPROCESS Professional Edition	Contains all the features and capabilities of SIMPROCESS, with no limits on model size.
SIMPROCESS University Edition	Contains all the features and capabilities of SIMPROCESS, but model sizes are limited to no more than 50 processes and activities.
SIMPROCESS Demonstration Edition	A limited version of SIMPROCESS; model sizes are limited to no more than 25 processes and activities, 5 entity types. Includes none of the advanced features of higher-end versions of SIMPROCESS.
SIMPROCESS Runtime Edition	Contains all the features and capabilities of SIMPROCESS except the ability to save. There are no limits on model size, but models built or modified cannot be saved.
Expert Fit	SIMPROCESS ships with Averill Law & Associates, Expert Fit – a modeling and simulation facility that determines automatically, and accurately, which probability distribution best represents a data set.



OptQuest	Add-on optimization facility for analyzing decision and planning problems. Automatically runs a SIMPROCESS model, varying the values for the model parameters and searches for optimum results within specified limits. Uses metaheuristic, mathematical optimization, and neural network components, to guide the search for best solutions to decision and planning problems.
Experiment Manager	Used to set up model runs that SIMPROCESS will run automatically, and, optionally, after each run, place simulation results in a database.
Dashboards/Dashboard Server	SIMPROCESS can display/publish models and simulations to HTML for distribution and browser-based viewing. SIMPROCESS dashboards are collections of dynamic graphs that can be displayed locally or remotely by a Dashboard Server (located in the SIMPROCESS directory). Dashboards can be used to display results of one or multiple models and simulations.
Pre-built Models and Templates	SCOR (Version 5) template. Templates also available for various resource schedules and manufacturing activity definitions such as Assemble, Batch, etc.
SIMPROCESS Database	Windows versions of SIMPROCESS include a MS Access 2000 database, which is designed to store simulation results from simulation runs. This database includes predefined queries, graphs, and reports – all of which can be tailored for output analysis. SIMPROCESS also works with other SQL databases such as MySQL, etc.
Rational Rose Link	SIMPROCESS provides a direct link to the Rational Rose development environment. Process models created in SIMPROCESS are linked directly with UML Use Case models in Rose. When SIMPROCESS models and Rose models are exported and published to HTML, they are automatically linked to provide users with an integrated view for business and systems requirements validation and software design, etc.
Dispatcher Service	Provides the ability to call on simulation capabilities and use the results to make automated business decisions. SIMPROCESS provides this capability through the Dispatcher, a Web service that can be deployed in a Web Container or an Application Server using the <a href="#">SIMPROCESS Dispatcher</a> .

SIMPROCESS is a general purpose process modeling and simulation environment that supports projects, ranging from manufacturing simulations and business process reengineering activities to large-scale business software development initiatives and ERP implementation efforts.

SIMPROCESS supports:

- Business analysis – SIMPROCESS’s simulation tools excel at modeling, simulating, and analyzing BPR/BPI initiatives.

- Architecture frameworks – Many of the DoD Architecture Framework artifacts are supported directly from SIMPROCESS.

- System requirements – SIMPROCESS provides a link to Rational ROSE for seamlessly moving from process analysis to system design.

- ERP implementation projects – Gap analysis, process reengineering, process configuration, and change management and support ERP projects.

- On-demand simulation – SIMPROCESS can integrate with applications as a Web Service to provide modeling capabilities and on-demand simulations.

- BI – SIMPROCESS can interface with third-party business activity monitoring (BAM) products to provide simulation and predictive capabilities.

- Six Sigma and Lean support – SIMPROCESS supports and extends Six Sigma and Lean analysis.

- SCOR– A SCOR model template is available.

## 2. Product Architecture

### 2.1. Architecture Overview

SIMPROCESS is platform independent. It functions as either a desktop Java application or as a server-based implementation that organizations can integrate into a larger (enterprise) application via a Service Oriented Architecture (SOA). Figure 1 depicts both implementation scenarios. Both are implemented from the same code set. Only licensing differs.

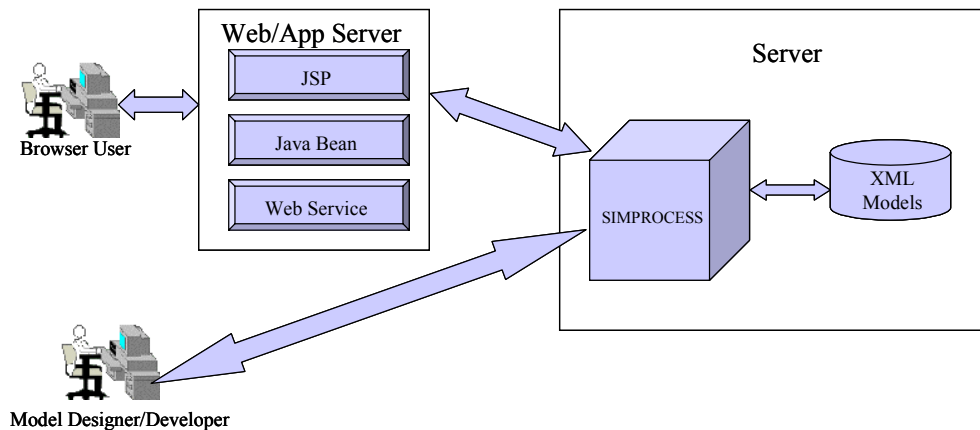


Figure 1. SIMPROCESS architecture/implementation scenarios.

In a desktop implementation, SIMPROCESS's GUI is used to construct and simulate models and experiment with business process scenarios. This is the more traditional use of SIMPROCESS as a business process analysis tool.

In an SOA implementation, SIMPROCESS operates as a Web Service that is called by other applications to perform simulations on demand. This capability enables SIMPROCESS to extend the spectrum of BPM because the same models developed in the desktop implementation to perform business process analysis are fully reusable in the SOA production implementation to provide predictive analysis and "round trip" business performance monitoring and feedback. Figure 2 shows SIMPROCESS deployed in a SOA configuration.

### 2.2. Usability and User Interface

SIMPROCESS as a stand-alone analysis tool is intended for both technical analysts and general business users. Because the latest version features the ability to use SIMPROCESS as a callable service in an SOA from any enterprise application, this puts simulation, predictive analysis, decision-support, and BPM capabilities onto managers' desktops without their having to "drive" the tool. This capability is called on demand and can be integrated with commercially available BI, decision support, and EAI technologies.

SIMPROCESS features a drag-and-drop GUI that provides dialog panels for updating the definition, documentation, and parameters of a business process model. Online context sensitive help is provided on all dialogs to explain the attributes. In addition, SIMPROCESS provides a Web publishing capability that makes navigation and review of models exportable to an enterprise-wide audience. Business people who do not have training in SIMPROCESS or its fundamental capabilities can easily view Web published models. Any activity or subprocess in a published SIMPROCESS model allows the reviewing user to send an email to a predetermined central email account to collect comments on the model. Email comments are within the context on which the user was commenting, without the user having to describe where they are in the model. Model developers can then pinpoint exactly where a user was

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when reviewing and commenting. CACI has used this capability for large military BPR projects where literally hundreds of reviewers are spread around the world.

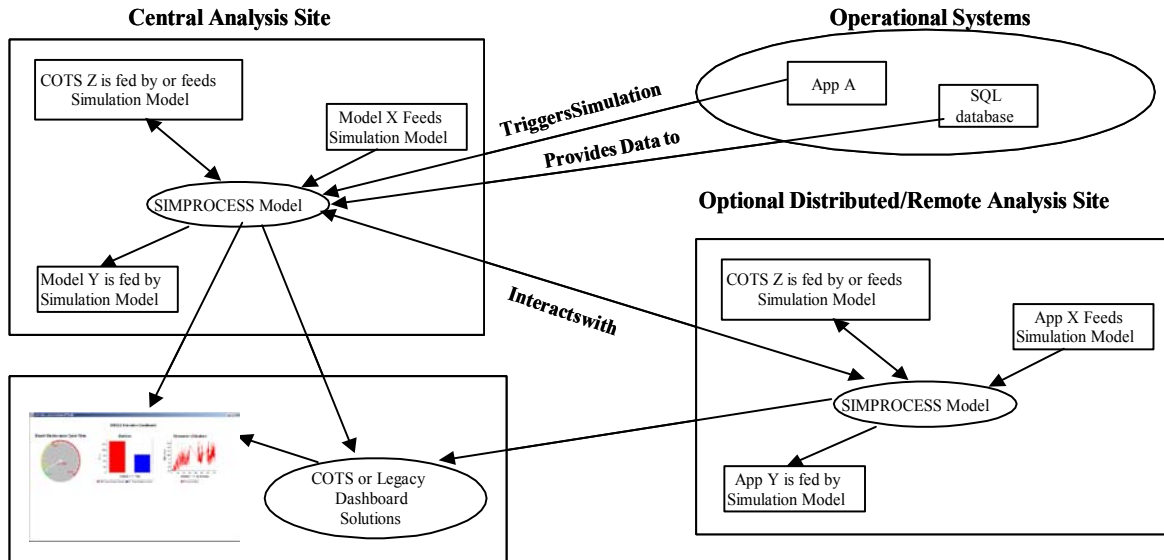


Figure 2. SIMPROCESS implemented as a Web Service in an SOA.

SIMPROCESS models are touted for their ability to be easily understood by business users and technical users. This is one of SIMPROCESS’ most prized distinctions – simplicity on the cover but powerful simulation and technical analysis capabilities underneath the hood. Figure 3 shows a SIMPROCESS GUI displaying a model pertaining to an Air Force aircraft maintenance modernization effort. This screen shows the “Plans and Schedules” subprocess.

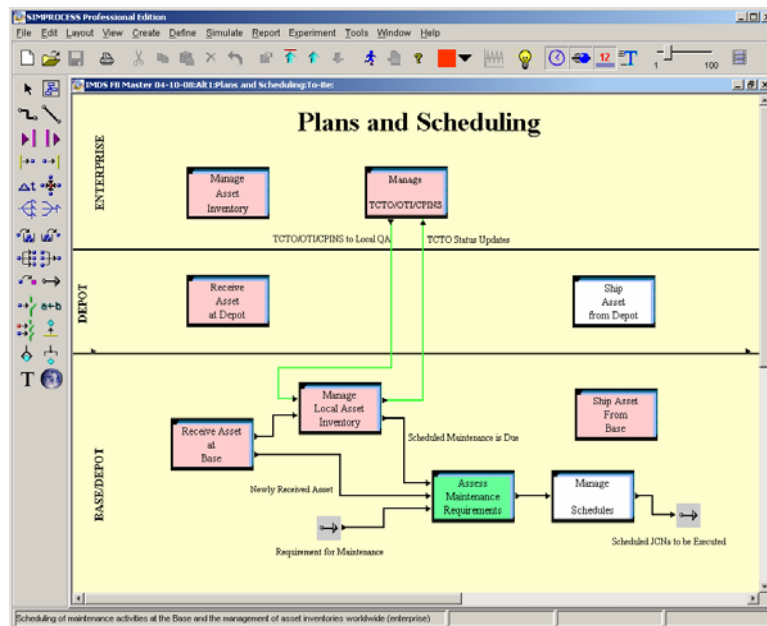


Figure 3. SIMPROCESS GUI displaying a model pertaining to part of an Air Force aircraft maintenance modernization effort.



### 2.3. Repository Options/Team Development

All models developed in SIMPROCESS are stored as hierarchical XML documents and are exportable to other XML representations such as XPDL or BPML.

SIMPROCESS is designed as a single-user application and does not explicitly provide repository-based team development capabilities. CACI suggests the use of third-party applications to support team development. They also believe that complex models do not lend themselves to multi-user update concepts (i.e., check-in/check-out, updating, etc.) because there are too many dependencies on the model components.

However, because SIMPROCESS models are stored as XML documents, they are easily managed by third-party configuration management and repository tools as ASCII files (similar to source code files). In addition, because the models are hierarchical, they can be separated and split among several team members, and then merged later – thus allowing SIMPROCESS to be used in a quasi-team scenario. For this purpose, SIMPROCESS features a Library Manager, which provides GUI capabilities that allow users to create templates from portions of models. Any activity or process defined in a model can be used as the basis for creating a template in a Library. A Library with one or more templates can be exported and given to other team members, who can then create models into which their assigned templates can be placed and edited. Once completed, the template can be replaced with an updated version in the Library and then exported back to the principal maintainer of the master model.

### 2.4. Integration with Other Products

SIMPROCESS can integrate with external products and applications. Integration with UML-based software modeling tools is done through XMI and is implemented as an import/export feature. Integration with Rational Rose is done through the Windows COM Automation API. CACI also offers a proprietary import/export capability for SIMPROCESS to work with the Ultimus workflow and BPM suite.

For integration with other business and workflow modeling languages, SIMPROCESS provides pre-built exports to XPDL. A BPML interface is under development. Future import/export capabilities with SIMPROCESS can be done natively in the Java code set or easily done externally through XQuery.

SIMPROCESS also provides a number of options for integration with external applications at runtime:

External Java classes – Users can extend SIMPROCESS's simulation functionality by developing their capability in Java (or Java-wrapped classes), which is directly callable by the SIMPROCESS expression scripts. This allows for any external application to be called during a simulation. External calls can also make native libraries (e.g., Windows DLL) available to a SIMPROCESS simulation.

Java RMI – SIMPROCESS is built on Java and provides RMI server classes that can be called by external applications to introduce events. They can also call external RMI server classes from the SIMPROCESS expression scripts during simulation.

ANSI SQL databases – SIMPROCESS provides full support for reading and writing ODBC-compliant SQL databases during simulation. SIMPROCESS expression scripts are used to implement access to SQL.

SOAP Calls – SIMPROCESS can use SOAP to make calls to any Web Service from the expression scripts during simulation.

Web Services – Any application that can make SOAP calls to a Web Service can interact with SIMPROCESS as a Web Service, including loading, running, managing, and reporting on simulation models. This provides the ability to perform simulations on demand from any application with SIMPROCESS implemented in a SOA.

### **3. Analysis and Process Modeling**

#### **3.1. Enterprise and Organization Models**

##### **Enterprise Architecture Models**

SIMPROCESS can capture and model the various components of an operation including systems, data, people, and architecture components. The most critical architecture views are directly supported by SIMPROCESS using the DoD Architecture Framework (for example, AV 2; OV 1, 3, 5, 6a, 7; SV 4,5,6,10a, and 11).

##### **Organization Models**

SIMPROCESS supports modeling organizational structures and relating processes to organizational units. Processes are presented in a swim lane format showing the alignment of the organization to the process components. Additionally, resources can be modeled as organizational units or as a pool of resources in an organizational unit by creating an org code attribute on the resource types. This allows SIMPROCESS to capture metrics about resources (metrics that can be selectively analyzed via SQL-based queries using the org. code attributes).

##### **Resource and Cost Modeling**

SIMPROCESS can model all types of resources – including facilities, human, equipment, consumable, and services, with costs defined as hourly, fixed, or per unit. In addition, schedule patterns can be defined to account for shifts as well as daily or seasonal variability. Downtime for resources can be defined as planned (e.g., lunch breaks) or unplanned (e.g., machine breakage modeled with time between failures and time to repair, etc.). Resources can be defined as shared or exclusive.

##### **Mapping Organization Strategies to Performance Measures**

SIMPROCESS models are easily mapped to performance measurements. Since SIMPROCESS is built on a simulation engine, such business measurements are easy to identify and apply at any point in the model. For example, if a business performance strategy is to reduce cycle time of delivering a product or service to a customer, SIMPROCESS has built-in measurements that are chosen in the GUI for reports to monitor entity cycle time. Another example would be if a performance strategy is cost-based (i.e., using an ABC methodology). In this instance, cost metrics are chosen to report ABC metrics for the processes/activities in the model. Measurements in SIMPROCESS are business focused (e.g., cycle time, resource costs, resource utilization, entity cost, activity based cost, etc.), and are easily reported and mapped to business performance strategies.

##### **Managing Process Portfolios**

Process portfolios are managed with SIMPROCESS models, which are stored as XML documents. They can be managed with any commercially available (or open source) configuration management or repository tool. Process nodes in a SIMPROCESS model can also carry attributes that categorize the process in a portfolio schema – such as by process owner, process type, etc.

Another useful feature is the ability to create and manage unlimited alternative process flows for any subprocess in a model. This allows users to create alternative processes across an organization and manage them as part of a process portfolio.

#### **3.2. Defining Processes**

##### **Define Processes**

Processes and activities within SIMPROCESS are defined via drag-and-drop GUI. Processes are hierarchical to an unlimited depth.

##### **Process Information Storage and Integrity**

Each activity is stored with its name, resources, time parameters, and the business rules needed to control the model via expressions. Additional descriptive information can be saved as part of a

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comment, documented through a linked text editor, or referenced via linked external documents or URLs.

Enforcement of process notation is done by both the controller module in the SIMPROCESS application as well as by the model module via XML.

### **Graphical Notations**

SIMPROCESS's graphical process notation is proprietary. It does, however, provide XML import/export capabilities to convert from SIMPROCESS notation to others. SIMPROCESS import/export capabilities include XPDL, XMI, UML, and Ultimus proprietary workflow notation. According to CACI representatives, BMPL is currently under development and will be available in the near future.

SIMPROCESS supports creating tailored notations in several ways. Users can import images in PNG, JPG, and GIF formats for incorporation into the SIMPROCESS library. Icons for activities can be tailored to align with various notations by importing the graphics for the process node types. Imported icons are managed in categories in SIMPROCESS, and can be assigned to different notation sets.

SIMPROCESS does not currently support BPMN; however, CACI is developing an XQuery import/export capability to move SIMPROCESS notations to BPML. This will provide model translation to BPMN-based tools.

SIMPROCESS supports UML version 2.0 through XMI. SIMPROCESS provides activity diagrams and classes for UML modeling tools.

## **3.3. Subprocesses and Activities**

### **Handling Subprocesses and Activities**

SIMPROCESS represents subprocesses as follows; Process boxes are used to represent hierarchical constructs, and, beneath each process, an entire flow can be defined to include one or more subprocesses as well as unique activities (discrete events). One of the most distinctive features of SIMPROCESS is the definition and management of alternative process flows at the subprocess level. Any subprocess in SIMPROCESS can have an unlimited number of alternative flows that are easily toggled to and viewed in the GUI. Additionally, alternative subprocesses can be selected in the Experiment Manager (an alternative analysis facility in SIMPROCESS – See Section 3.4.2) to define unlimited scenarios for experimentation and analysis.

### **Defining Activities**

Activities are created via drag-and-drop GUI. Their definition and meaning is derived from the delay times, resources, business rules, and documentation attributes included with them in the model.

### **Documenting Decision Rules**

Descriptive documentation about the process step can be placed in the comment line, added via a linked text editor, or linked via a document or URL.

### **Rules Entry**

Rules that alter process sequence or behavior are captured through the various constructs and their implicit behavior. SIMPROCESS utilizes an innovative activity-based modeling paradigm in which real world behavior of activities such as copying, assembling, transformation, batching, and branching are built into the tool. SIMPROCESS features a suite of pre-built "Activities blocks," which are used for assembling logic-based business models and simulations. These activities can be connected or embedded into processes by using simple flowcharting techniques, thus making process documentation fairly straightforward. Users can also customize pre-built activity blocks to represent the operational characteristics of their own business processes. Figure 4 shows the various activities available in SIMPROCESS Activities Suite, each activity reflecting a different type of action (which can be physical or logical).





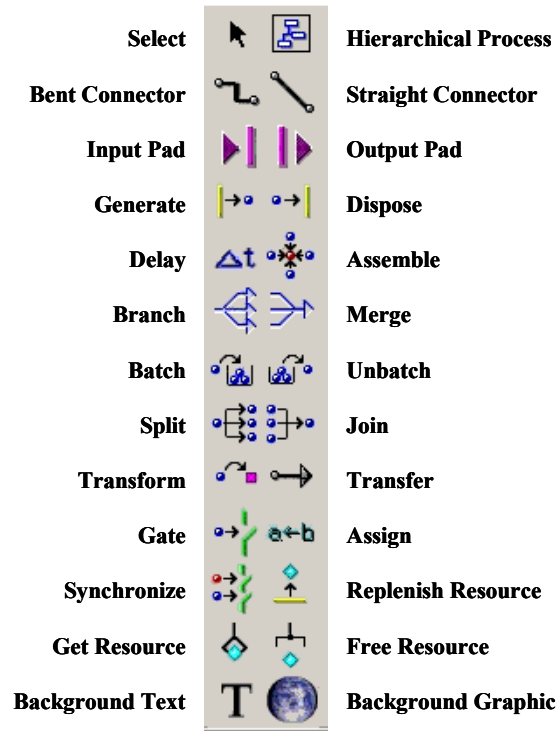


Figure 4. SIMPROCESS Activities Suite

SIMPROCESS also offers advanced capabilities for extending and customizing the behavior of a model and for implementing business rules that do not conform to the pre-defined constructs (i.e., those included in the Activities Suite). These include user-defined attributes, expression scripts, and other advanced functions.

**User-defined attributes.** Attributes are variables of model elements whose values can change during the course of a simulation run. (For example, in the case of a Batch Process where Entity release depends on the weight of Entities received, an attribute is the total weight of the items accumulated in the batch Activity.) By defining their own set of attributes, users can customize a model. Such attributes can represent model element attributes that are not built into SIMPROCESS, such as entity weight or size, skill level of a resource, or service level. SIMPROCESS allows users to define attributes in association with

- Entity types, or entity instances
- Processes or activities
- Resources
- Models

When defining an attribute, users either instruct SIMPROCESS to create an instance of that attribute for every model element of the same type (e.g., entities, resources, etc.), or create the attribute for a particular type of model element (e.g., customer order entities, truck resources, etc.). In SIMPROCESS terminology, attributes are either globally defined or locally defined, while model attributes are only globally defined.

**Expressions.** The ability to create and set attributes provides a powerful simulation feature when used in conjunction with Expressions. Expressions are user-written statements executed by SIMPROCESS during a simulation run. To define an Expression, the user selects the point at which she wants the Expression to be evaluated – for example, at the beginning of the simulation, or at the moment an entity

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(e.g., a customer order) is received by an activity (e.g., order distribution). SIMPROCESS features an Expression Editor that allows users lacking in-depth programming experience to build complex models. Basically, it allows users to construct Expression statements using a point-and-click editor, thereby greatly simplifying the development of complex model behavior.

#### **Activity Costs, Resources, and Time Data**

In SIMPROCESS, costs are associated with the resources used, and are stored as parameters of the resources themselves. The parameters of the activity include the resources required to perform the step, as well as the duration necessary to complete it. Cost metrics are captured, stored, and reported for entities, resources, and activities. Users can capture and report user-defined metrics by adding attributes (see previous section for description of user-defined attributes, expressions, and functions) and by plotting them or writing them to an SQL database (see Section 3.4.2 for database usage).

### **3.4. Simulation**

#### **Simulation Capabilities**

SIMPROCESS is inherently a Discrete Event simulation package combined with ABC and analysis capabilities. A simulation is implemented in SIMPROCESS as a state machine that moves entities through a complex network of process nodes. As the entities arrive at the nodes, they are processed based on the delays defined for the node. Additionally, if resources are required at a node, then the entities are processed as the resources for that node become available, thus creating wait queues when the resources are not available, or when processing times exceed the rate in which new entities arrive.

SIMPROCESS provides the ability to view an animation of a simulation as it runs. It also includes post-simulation animation feature that allows users to view an animation from a simulation without the simulation running. This takes the form of a playback feature that allows users to record animation for playback. Animations can be recorded without displaying the animation during a simulation. During playback of animations that have been recorded, you can pause, fast forward, and rewind.

#### **Analytic Capabilities**

SIMPROCESS simulations provide the ability to

- Measure time, costs, resources, throughput, capacity, and identify bottlenecks
- Visualize/validate current processes, problems, system states, organizational responsibilities
- Design/test improvements for resource allocations, streamlining, and leveraging technology
- Develop a business case, test/validate performance data or financial data, assess ROI
- Communicate plans and strategies to decision makers and stakeholders

SIMPROCESS allows users to store simulation results in a database. Windows versions of SIMPROCESS include a Microsoft Access 2000 database designed to store simulation results from different simulation runs. It includes predefined queries, graphs, and reports – all of which can be copied or modified for customized analyses. SIMPROCESS can also work with other SQL databases, such as MySQL, Oracle, or SQL Server.

SIMPROCESS's Experiment Manager offers an alternative analysis facility that can be used to define and conduct different simulations applied to different scenarios. Experiment Manager lets users set up model runs that SIMPROCESS will run automatically, and, optionally, after each run, place the simulation results in the database.

In effect, Experiment Manager allows users to experiment and analyze processes and process interactions by conducting an unlimited numbers of simulations for different scenarios.

Optek's OptQuest optimization facility can also be bundled with SIMPROCESS as an add-on that is especially useful for analyzing decision and planning problems. OptQuest will automatically run a SIMPROCESS model, varying the values for the model parameters while searching for optimum results

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within the specified limits. OptQuest's engine uses metaheuristic, mathematical optimization and neural network techniques to guide its search in order to find the best solution to decision and planning problems.

#### **Real-time Data Utilization**

SIMPROCESS can read data in real-time from any ODBC-compliant database and use the data as parameters in any field or attribute within a model. Cost data, entity generation, and resource levels are just some of the ways users can use real-time data.

SIMPROCESS can also utilize real-time data for simulations via a Java RMI server. SIMPROCESS features a special external schedule (arrive queue for entities in the simulation) construct that is actually a Java RMI server. This RMI server functions as a "listener interface" for external applications to call and feed entities to SIMPROCESS at runtime.

As described in Section 2.1, SIMPROCESS can also interact in real-time with operational systems when implemented as a Web Service in a SOA. This method is similar to the Java RMI approach just described, except that it opens up a broader range of possibilities and ease of implementation using industry standard protocols like SOAP.

#### **Model Distribution and Simulation on Enterprise Networks**

SIMPROCESS's dashboard feature allows models and simulations (as well as dynamic graphs displaying their output) to be displayed locally or remotely distributed across a network. Dashboards can display results of one or multiple models and simulations across a network. Models can also feed one another during simulation, providing the ability to separate out functional portions of a model to different CPUs for enhanced scalability and performance. Similarly, SIMPROCESS can also communicate with other simulation modeling tools/techniques (such as Vensim Systems Dynamic models) running on the same or a different computer.

SIMPROCESS's dashboard feature is also unique because dashboards can be updated by multiple SIMPROCESS simulations at the same time as well as by a single SIMPROCESS simulation updating multiple (broadcast) copies of the dashboard to different viewers desktops simultaneously.

In addition, real-time plots (see reporting capabilities and analysis below) can be assigned to a separate computer. This is implemented in two ways. One is with a Plot Server module that is placed on a separate computer on a local network where the real-time plot set-up dialogs are given the server name. The other involves the use of an external dashboard, which can be run anywhere on a WAN. This feature is useful when using simulation for group analysis sessions. Plotting of many graphs (multiple business measurements of interest, etc.) to multiple viewers can cause a screen to become cluttered. SIMPROCESS's Plot Server and dashboard features allow multiple screens to be presented from several computers. This helps provide an uncluttered display and enhances simulation performance.

#### **Statistical Fit/Data Analysis**

SIMPROCESS ships with Averill Law & Associates' Expert Fit tool, which is executable from within SIMPROCESS. This tool is designed to automatically determine the best-fitting probability distribution for a data set. In addition to increasing the accuracy of a simulation and decreasing the time to find the solution to a problem, it also performs data analysis and can be used to model random processes.

#### **Capture and Reporting of Simulated Metrics**

The default output of SIMPROCESS is a standard text-based report. Users can also save reports as spreadsheets or save to SQL databases (as described in Section 3.4.2). Saved reports include a full set of statistical data used for process analysis. Standard reports are also augmented by various real-time plots and graphs that can be generated to highlight process analysis behavior for specific areas. A Custom Plot feature is also available that allows users to plot multiple values on the same plot.

## 4. Business Process Methodologies

### 4.1. Business Process Methodologies

SIMPROCESS uses a proprietary methodology to support process analysis and redesign. SIMPROCESS does not directly support any of the popular commercial business process analysis and redesign methodologies; however, SIMPROCESS provides a flexible process modeling environment that can be customized to support most methodologies. (See Section 3.2.3 for more on customization of SIMPROCESS graphical notation.)

### 4.2. Six Sigma Support

CACI does not currently offer a pre-packaged Six Sigma solution for SIMPROCESS. However, SIMPROCESS can be used to support Six Sigma efforts through its ability to define, measure, analyze, and simulate processes for improvement and control.

SIMPROCESS supports Six Sigma by

- Capturing and organizing comprehensive process data, reducing overall measurement cost and time, and establishing a framework used throughout the Six Sigma life cycle;
- Uncovering process inefficiencies and non-value added activities;
- Identifying key factors and variables influencing business process performance;
- Benchmarking internal processes and industry best practices;
- Evaluating alternatives prior to implementation;
- Visualizing process behavior, measuring performance, and performing "what-if" analysis;
- Creating alternative representations of a business process within the same model;
- Enabling rapid mapping of improved processes;
- Providing an integrated solution for continuous process improvement;
- Monitoring and controlling improved processes through the use of real-time plots, bar charts, and histograms;
- Providing predictive analysis (i.e., projected metrics) of key business measurements via simulation and feedback via metrics dashboards.

## 5. Report Generation and Document Management

In SIMPROCESS, all reports and data associated with a model are stored in a subdirectory associated with the model (except with SQL databases). Reports consist of text files, Excel files, and SQL databases. SQL databases are stored locally or as distributed databases with remote connections inherent to the database package (e.g., Access, MySQL, Oracle, or SQL Server, etc.).

SIMPROCESS uses standard Java 2-D graphics rendering to generate (and print) model definition reports describing the structure, content, and definition of a model. Models are easily exported for publishing to HTML format. Users can either share HTML files with peers or place them on a server for broad-area review. All model parameters are included in the HTML output, including an HTML page that guides the user on how to navigate the model. HTML output provides consistent links to any external documents or URLs that are defined in SIMPROCESS activities as well as links to Rational Rose. Users can also publish links to Rational Rose – including to the same root folder that the SIMPROCESS model is published to – providing a fully integrated HTML model that has active links between SIMPROCESS constructs and Rational Rose UML constructs. The result is a SIMPROCESS and Rose UML model that appears completely seamless to the viewer.

## **6. Development Environment**

### **6.1. Language of Tool**

SIMPROCESS is written in Java and uses XML as its data format. Its architecture is based on a Model-View-Controller architectural pattern to allow future improvements in maintainability and flexibility.

Because SIMPROCESS stores models and much of its internal data in XML, it adheres rigidly to standards established by the W<sup>3</sup>C. This is assured by using standards-compliant XML tools and those included as part of the Java 2 platform. CACI developers also rigorously check source code to avoid platform-specific coding, except where required to provide specific functionality or resolve language-related issues.

### **6.2. Product Support, Maintenance, and New Versions**

After each new release of Sun's Java 2 platform, the SIMPROCESS team considers the implications of changes and any anticipated issues with any supported platforms before deciding whether to use a new Java release.

The SIMPROCESS development team is part of CACI's software services division, which has been assessed at SEI CMM Level III for over seven years. The team also includes customer support specialists who take into account user questions, feedback, or interests in additional features. This enables quick response should a significant issue arise so that a maintenance release can be developed or (in special circumstances) provided directly to an affected user.

New product releases occur periodically, and existing customers are advised so they can obtain updates. Each SIMPROCESS model stores a version number as an identifier. The model file structure evolves with added capabilities and features; therefore, models created with a later release may not be able to be opened with earlier releases. SIMPROCESS maintains forward compatibility.

## **7. Software Modeling and Code Generation**

SIMPROCESS does not generate code. It is focused on the business process layer and relies on third-party tools to provide code generation. SIMPROCESS integrates with various third-party software development tools, including Rational Rose. Business process models created in SIMPROCESS are linked directly with UML Use Case models in Rose. This linkage provides a clear understanding of where a system should provide functionality in support of business process steps. When SIMPROCESS models and Rose models are exported and published to HTML, they are automatically linked to provide users with an integrated view for business and systems requirements validation.

SIMPROCESS generates UML Activity Diagrams and Class definitions through the UML XMI standard. SIMPROCESS XMI output has also been tested with a leading Open Source UML tool, ArgoUML.

### **7.1. UML Model Generation**

SIMPROCESS can export and import models to XPDL. It can also export models to UML Activity Diagrams in the format of the UML XMI specification. Models exported to HTML format can be opened by any Web browser that supports frames, JavaScript 1.2, and simple Cascading Style Sheets. Upcoming releases will include the ability to export to BPML.

### **7.2. BPEL Generation**

SIMPROCESS does not currently generate BPEL.

## 8. Templates and Frameworks

SIMPROCESS offers a SCOR (Version 5) template. Templates are also available for resource schedules and manufacturing activity definitions such as Assemble, Batch, and so on.

## 9. Systems Administration and Security

Because SIMPROCESS is a single-user application, there is no system or user set-up. Access to model files is controlled at the operating system level by restricting access to locations where they are stored. Access to the application may also be partially controlled by the operating system, denying users the privileges needed to locate or execute the program, and may be further restricted by a license manager server.

SIMPROCESS uses a third-party licensed management product to control access to the product. In addition, access to model files is controlled at the operating system level by restricting access to locations where they are stored. (For more about the sharing of SIMPROCESS models, see section 2.3.)

SIMPROCESS relies on third-party CM/source code tools (e.g., ClearCase, DOORS, PVCS, CVS, etc.) and the operating system being used (SIMPROCESS is platform independent) for administering and managing the work environment.

User set up and administration depends on the operating system used (SIMPROCESS is platform independent). Access to SIMPROCESS licenses is done either on individual desktop installations or via server installations. In either case, SIMPROCESS uses a commercial licensing product called FLEXlm to manage access to the product.

## 10. Scalability

SIMPROCESS is designed around a portable and scalable architecture. It is built on a Model-View-Controller architecture design pattern and coded in multi-threaded Java objects. The SIMPROCESS simulation thread can be run on scalable hardware such as SMP UNIX and Linux multiprocessor hardware.

SIMPROCESS models can be separated into separate models and interfaced during simulation. For example, a supply-chain model can be placed on one server and transportation or planning models can be placed on different servers, and the simulations will communicate over TCP/IP as if they were one large logical model. This feature is a major distinction for SIMPROCESS over typical EA and BP modeling and analysis simulation products because it allows distribution of large functional simulations, which can be run efficiently to produce quick results.

SIMPROCESS's performance is achieved by means of its scalable and distributed capabilities. Since SIMPROCESS is portable Java, it can take advantage of any operating system that can utilize a large memory address space. For example, if a model requires 2 gigabytes of memory to meet customer performance requirements, a SIMPROCESS server license can be placed on a UNIX or Linux server with that much real (or virtual) memory.

## 11. Platforms

SIMPROCESS is available for Windows (98, NT, 2000, XP and 2003) and for Linux on Intel-compatible 32-bit processors. SIMPROCESS licensing software only supports versions that are fully compatible with Red Hat versions 6 - 8, or Caldera 2.3 or higher. SIMPROCESS has also been tested on Mandrake Linux 9 and SuSE Linux 8 and found to run without difficulties.



## 12. Pricing

SIMPROCESS pricing starts at \$9,995. Discounts are given on multiple copies. Optional components are additional. Pricing for a minimum configuration (8-user system) is as follows: The first “seat” would be \$9,995. Each additional “seat” would be \$5,000. So the cost of an 8-seat system would be \$45,000.

## 13. Company, Product Positioning, and Support

### 13.1. Company Background Information

CACI is a systems integration, software, and services firm with over US \$1 Billion in annual revenue. It was founded in 1962, pioneering in simulation software; is publicly held; and has about 9,400 employees worldwide. CACI has more than 100 offices throughout North America and Western Europe, with overall reported revenues of approximately US \$1.1 billion in 2004.

CACI has two groups that specialize in simulation. One sells SIMSCRIPT – a simulation language designed primarily for large-scale military simulation services. The focus of this study is not concerned with that group. SIMPROCESS is managed by the Advanced Systems Division, which has about 200 employees. Approximately 20% of the division is directly involved with SIMPROCESS, either as a product or related services. SIMPROCESS product sales account for approximately US \$500,000/year in revenue. Services generate about US \$8 million-\$10 million annually.

### 13.2. Positioning

SIMPROCESS actually spans two market areas: simulation and process modeling.

The Advanced Systems Division Group that develops, maintains, markets, and manages SIMPROCESS has significant BPR and software development capabilities. It has used SIMPROCESS’s strong simulation capabilities as a commercial product to win large-scale business modernization and systems development projects for both government and industry.

CACI has positioned SIMPROCESS to support a range of EA modeling and BP change activities, including:

- Enterprise architecture modeling and analysis
- Process modeling and analysis, redesign, and improvement
- Detailed process modeling and analysis
- IT support/software development
- Human performance improvement initiatives
- Development of management and measurement systems

### 13.3. Product Training

CACI, and the Advanced Systems Group, offer business process consulting and training services. In addition to offering courses on SIMPROCESS training, CACI offers courses covering advanced topics, such as project management with simulation, change management, and simulation analysis.

### 13.4. Business Process Consulting

The Advanced Systems Division Group provides a full range of solutions, including BPR, software modernization, ERP implementation support, and custom software solutions.

## 14. Case Study

The City of Beaverton (COB) Municipal Court (MC) (Beaverton, Oregon, USA) was experiencing growing pains associated with its current business practices and the introduction of a new source of

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citations – photo radar. The Court had experienced an average increase of 19.5% in total cases filed and projected a conservative annual increase of 14%. It was estimated that photo radar citations would increase the Court's workload by an additional 14,000 to 21,000 citations a year. These volumes exceeded the capacity of the Municipal Court staff and their current processes and systems.

The Court staff felt that additional resources were required to provide customers with an acceptable level of service. In addition, workload volumes were stretching staff capacity, forcing them to work overtime frequently, while the core processes were paper-driven, and computer systems support was limited and not fully utilized because of a technology-fearful staff.

In 1996, the City engaged CACI to conduct a Business Process Improvement (BPI) analysis and implementation plan for the Municipal Court. The goal was to understand the Municipal Court's business needs model and simulate the "As Is" state, develop a "To Be" simulation model, and use the simulation model to sell the City Council the recommended solutions that would significantly improve the Municipal Court operations. The implementation plan addressed the costs, benefits, and actions associated with implementing the proposed solution.

As a result of the BPI analysis, CACI found that the Municipal Court required a solution that would provide users quick, easy, and reliable access to current documents; ensure document completeness and accuracy; and address formal procedures and technologies.

CACI recommended the implementation of a two-phased plan. Phase I – “Less Paper” – would ready the Municipal Court for technology insertion by addressing quick hit improvement initiatives to realize benefits in

- Manual records and filing facilities
- Automated information systems
- Office facilities
- Work flow
- Scheduling

The BPI Analysis projected the City's annual cost savings would be between US \$33,000 - \$100,000 with the implementation of Phase I – “Less Paper.”

Benefits of Phase I include

- Reduced citation processing (search, retrieval, docketing) by 9%
- Gain 0.6 Court Clerk Full Time Equivalent (FTE)
- Increase the Court's capacity to process citations, including photo radar
- Readying the Court for new technology and processes

Phase II – “Paperless ” implementation – would save the City between US \$100,000 - \$250,000 per year after the solution was firmly established. Benefits of the Intelligent Document Management (IDM) system include:

- Reduced citation processing by 35%
- Gain 2.1 Court Clerk FTE
- Improved customer service by decreasing citation search and retrieval by 20% - 50%
- Increased citation processing (capture, retention, display, and printing of document images) capacity by 78%
- Eliminate risk of document loss through systematic document archival
- A reusable service delivery solution (intra-City or inter-government)

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Phase III – “Less Paper” – incremental savings would be addressed as "soft" savings since no "hard" data was collected for the Jan-1997 implementation. This analysis would measure the Phase II ("Paperless") implementation and address the following key questions:

What actually changed as a result of the consulting project, and did it have an impact on the Municipal Court?

Was the consulting project a good investment?

Did the project drive key intangible measures that are often difficult to quantify yet critical to the success of the Municipal Court?

Does the Municipal Court require additional staff to support current and near future operations?

Future improvements include moving the Municipal Court's internal WINCS system online via the Internet. This Government-to-Citizen Internet link may include a site that provides court information and the ability to pay fines by credit card or electronic checks over the Internet 24 hours a day, 7 days a week, without increasing staffing levels or hours of court operations. This use of the Internet is attractive given the likely increase in case volumes with the introduction of Photo Red Light or the addition of more Photo Radar Vans. An online court payment system will allow the Court to collect a higher percentage of fines faster, while saving money currently spent on processing "walk-in" defendants.

The Municipal Court has begun to investigate a courtroom videoconferencing link with jails and juvenile detention facilities in another area. Videoconferencing can potentially save courts the cost of prisoner transportation. Undoubtedly, the Municipal Court will continue to use SIMPROCESS models to analyze, communicate, and measure City investments.

## 15. Company Offices

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For a list of resellers, check the CACI website:

[www.simprocess.com](http://www.simprocess.com)

## Holocentric Modeler

Version: 4.4

### Holocentric

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#### 1. Product Overview

Holocentric's flagship product, Holocentric Modeler, is a general purpose modeling environment that allows users to model, communicate, and manage both organizational and technology environments. Its various organizational modeling capabilities bring together the strategies and goals, organizational structures and functions, people and roles, business processes and IT systems necessary for aligning IT with business process requirements.

Holocentric Modeler supports a range of EA and business process analysis and modeling activities, including

- Corporate governance and compliance with external regulations
- Business process outsourcing
- Mergers and acquisitions (identifying the differences between organizations and the opportunities for improvement)
- Incremental and continual process improvement
- Aligning IT systems with organizational requirements
- Optimizing supply chain operations

Table 1 gives an overview of the Holocentric Modeler product suite, which consists of three modeling tool components: Business Modeler, Technology Modeler, and Enterprise Explorer. Holocentric Modeling Suite offers an easily deployable product that provides broad coverage from organization and business process modeling through technology modeling and round-trip engineering of IT systems.

Holocentric Modeler utilizes what the company emphasizes is a role-based business process modeling approach designed to cater to different end-user perspectives, basically allowing a subset of the tool's functionality to be presented, as appropriate. Thus, it is accessible to both business users and analysts who are interested in the business processes and their relationship to the organization as well as to the technology designers and developers who need to consider software engineering detail.

Holocentric believes that the role of people in processes must be strongly emphasized. As a result, Holocentric Modeler's role-based approach is also designed to support the incorporation (and detailed modeling) of the roles that people play in business processes.

In addition to providing enterprise architecture support and process modeling capabilities, with the addition of specific add-in modules, Holocentric Modeler also handles forward and reverse engineering of information systems in a variety of programming languages.

**Table 1—Overview of Holocentric Modeler Product Suite**

Holocentric Business Modeler	Business process modeling and analysis component. Provides a visual representation of an organization’s strategy, plans, and goals and the business processes required to support these goals. Supports various process modeling approaches, including BPMN, UML, and role-based process modeling.
Holocentric Technology Modeler	UML-based software engineering and modeling component. Relates the business requirements defined in the process models (created in Business Modeler) to technology requirements for IT systems development. Interfaces to other development environments via XML. Methodology independent, although Holocentric offers its own methodology (Systems Development Lifecycle) for use with Technology Modeler. Offers forward and reverse engineering of languages, including: C++, VBX, Java, Delphi, Advantage Gen, and Forte UDS. Available as a plug-in within MS Visual Studio. Source code generated from Technology Modeler can be used with Visual Studio .Net; also works with code created within Visual Studio .Net environment.
Holocentric Enterprise Explorer	Interface component for integrating Holocentric Modeler components (i.e., Business and Technology Modelers) with MS Office (Word, Excel, InfoPath, SharePoint Portal Server). Allows end users to access models via the familiar Office interface for navigation, analysis, and documentation purposes. Integration with Word provides documentation capabilities; integration with Excel provides “what-if” analysis capabilities; InfoPath provides information gathering capabilities; integration with SharePoint Portal Server provides information sharing and collaboration.
Holocentric Modeler Team Add-In	Add-on module that supports multiple users for team development. Provides sophisticated capabilities to allocate the work amongst team members, model locking, and administration and control features, which improve security and integrity over all model items. Work can be divided between team members, defining who can update at the item level.
Pre-built Models & Templates	Holocentric Enterprise Management Reference Model, IT Infrastructure Library IT Service Management Template, ISO 12207 Software Lifecycle Template, SCOR Framework.
Technology Modeler Language Add-Ins	Add-Ins extend the base tool environment by adding editor support and import/export (i.e., reverse engineering and code generation) facilities to support specific programming languages and environments. Add-Ins are available for a variety of language including C#, Visual Studio.Net, Delphi, Java, C++, VBX, Smalltalk, UDS-Forte 4GL, Centura Team Developer/Gupta SQL Windows and AdvantageGen.

Tight integration with Microsoft technologies makes the various components comprising the tool integrate easily with Microsoft software development tools, portal, and Office applications.

Holocentric Modeler makes extensive use of UML, BPMN, XML, and XMI for process/systems modeling and management of associated information. In addition, close adherence to the OMG’s Model Driven Architecture (MDA) means the tool can support virtually any modeling construct.

Models and associated information developed in Holocentric Modeler can be published in HTML format. An optional “Add-In” module is available that allows Holocentric Modeler to be used for team development. A number of horizontal and industry frameworks are also available for use with Holocentric Modeler.



## 2. Product Architecture

### 2.1. Architecture Overview

Figure 1 provides an overview of the Holocentric Modeler architecture and its different components. The key to Holocentric Modeler is that it is built on a meta-model, which provides the ability to build and customize Modeler products. This meta-model is based on the OMG’s Meta Object facility (MOF) (shown in Figure 2) and MDA, which allows developers to customize the tool to support virtually any kind of modeling approach, methodologies, frameworks, and application architectures. Holocentric uses the Modeler to maintain the application architecture and source code of the product. Corporate designers and developers can use the Modeler to make changes to models, which results in the regeneration of source code, providing extensive flexibility for customizing the product to support different methodologies, frameworks, and application architectures.

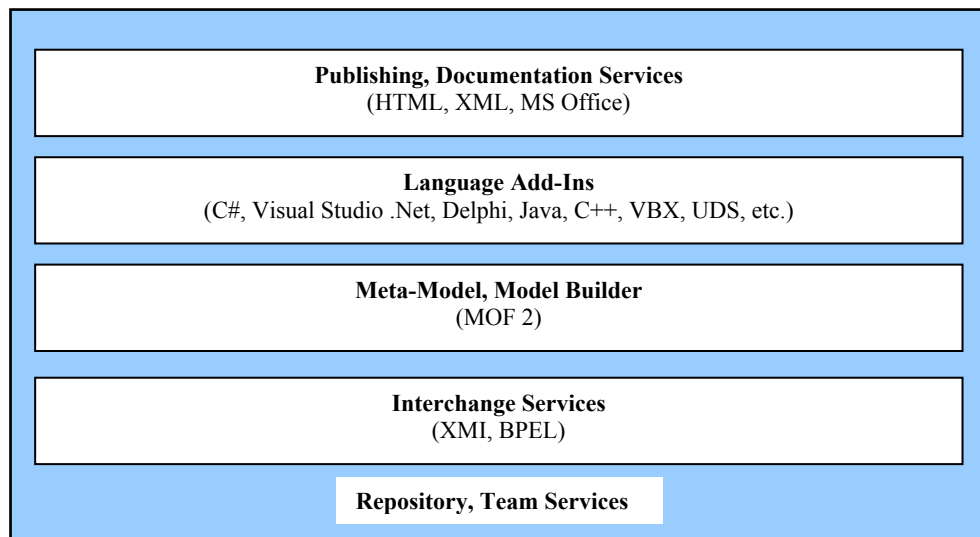


Figure 1. Holocentric Modeler Architecture.

### 2.2. Usability and User Interface

Holocentric Modeler can operate in single- or multi-user modes. One of Holocentric’s main goals is to ensure that users do not require significant investment by their IT departments for support. As a result, Holocentric Modeler has been designed to be so unobtrusive that many users are required only to install client software, requiring no additional software or database. The product is designed to operate either stand-alone or with a repository, allowing sharing of information with other products.

Holocentric Modeler supports both business and technical users by allowing them to select the user perspective best suited to their needs and goals. Basically, a user perspective corresponds to a set of roles. Each perspective adds to the tool’s menu the functions used by the roles that it covers – in short, allowing a subset of the tool’s capability to be presented, as appropriate. For instance, a business analyst has a specific perspective that omits more technical functions, such as importing source code, while a programmer sees specific language support within the product. This feature allows Holocentric to provide a very rich set of functionality with the product, while simplifying its operation for individual users. In addition, Holocentric Modeler’s application architecture allows the product to be configured based on a license key. This means that customers can license different aspects of the product and enjoy flexibility in purchasing options (in contrast to monolithic application and inflexible pricing models).



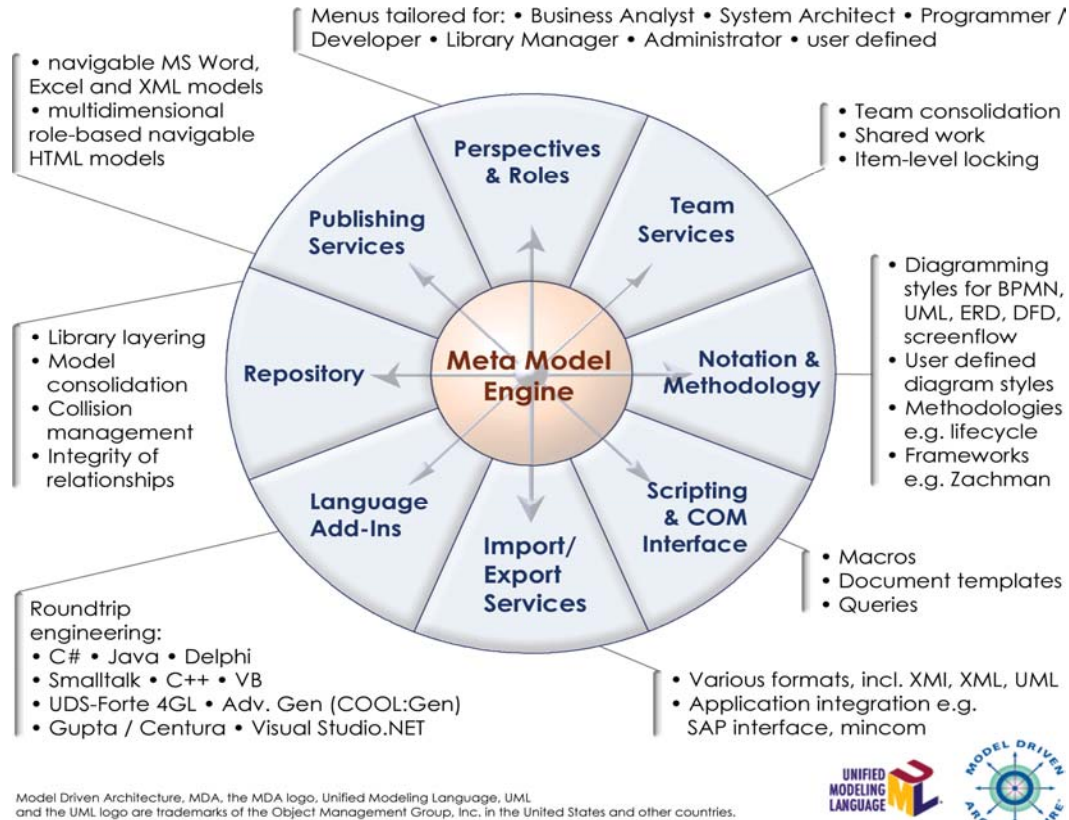


Figure 2. Holocentric’s Meta-model is based on the OMG’s MOF/MDA.

Figure 3 shows the Holocentric Modeler GUI. Users can create roles, activities, and processes through a simple add, select, and place approach via the tool’s palette on each process diagram. Users can create overview diagrams, showing items of any type from within the model and relationships between them. This provides a quick and easy means to present information to stakeholders in different ways, and to provide a navigation path through the model tailored to specific audiences.

Users can also add links to external documents and other resources to extend the model. The tool allows users to generate fully cross-referenced websites. These websites can include external links, allowing users to incorporate virtually any content into the site. Models or parts of models can then be easily generated as web pages, which allow flexible navigation of models (and associated information) by end users.

While the implementation of change in organizations is often complex, it is typically the cultural change to be implemented via people and changing roles that is the most difficult to define and model. Holocentric places a great deal of emphasis on people. In the diagram shown in Figure 3 (and throughout its associated process models), it is important to understand not just what the process is, but who is responsible for the process and whom the process affects. As a result, in Holocentric Modeler, users can view the organization perspective as well as the definition of roles. This allows users to build a complete role definition, not as a separate exercise, but as a byproduct of the process models. This provides a very strong link through to the implementation of changes in processes and people.

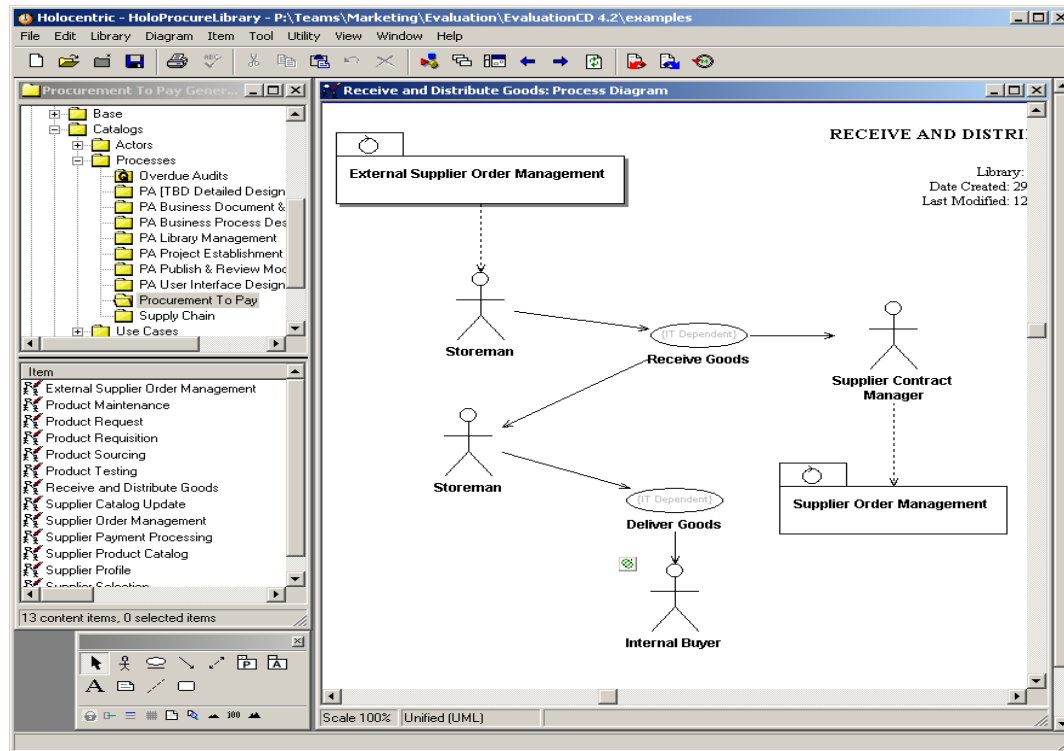


Figure 3. Holocentric Modeler GUI

**2.3. Repository Options/Team Development**

Holocentric Modeler can be used in single- or multi-user modes. All configurations of the application allow import/export of data in a large range of formats, including XML, binary, and even byte code. An optional team add-in module enables multi-user access to models with item-level locking, along with team consolidation and administration, which ensures that users can gain access to models and share them easily.

An upcoming Enterprise Server version is targeted for availability in Q3 2005 that will allow for greater centralized management of integrated, large model repositories. This will enable easier interaction and integration with related tools, such as requirements management.

**2.4. Integration with Other Products**

Holocentric Modeler has a number of core features that allow interoperability with other products, along with the use of a range of standards-based import/export formats.

Holocentric Modeler can act as both a COM client and server. It also features a complete scripting language that integrates seamlessly with COM and which can also be used within report templates.

The tool can import and export XMI for UML (software modeling) and CWM (data warehouse modeling), and a variety of technology-based tools exist that use XMI for interchange of model information. Users can also create custom import and export formats. Company reps say that a BPEL export capability will be available in Q3 2005.

The Business Modeler interfaces with and utilizes the capabilities of Microsoft Office. As well as being able to link to external documents, Business Modeler

- Produces documents in Microsoft Word
- Uses Microsoft Excel to export path information and perform analysis and simulation



- Publishes Websites and model information into Microsoft Sharepoint
- Understands and models dependencies which can be used for planning through Microsoft Project
- Generates Infopath schema from class specifications
- Supports a bi-directional interface with SQL databases to update model property values

Technology Modeler includes an add-in for Microsoft's Visual Studio development environment, providing synchronized, round-trip integration for software design and development.

The Enterprise Explorer module integrates with Microsoft Office Word 2003 and Excel 2003. This allows end users to use the familiar Office UI to access the business and technology models (created in Holocentric Modeler), thereby providing flexible documentation and analysis capabilities. Users can also use the Office interface to navigate through models to better understand the context of the information and to provide feedback for improvements relating to their expertise.

### **3. Analysis and Process Modeling**

#### **3.1. Enterprise and Organization Models**

##### **Enterprise Architecture Models**

Holocentric Modeler provides support for a variety of enterprise architecture approaches without forcing users to adopt a specific representation. Because the product is based on a "meta-driven approach," end-user organizations can customize the tool to support different enterprise architecture models and methodologies.

The standard product ships with support for the Zachman framework, allowing bi-directional links to be established between elements within the Zachman Framework and the full variety of artifacts within the product. These artifacts can include proxy items to external documents or any URL.

##### **Organization Models**

Business Modeler provides the ability to model organizations down through roles to people. Because the business process models employ a role-based approach, the processes are inherently linked to roles, which in turn belong to organizational units and organizational structures. In addition, organizations can be modeled through various depictions such as a conventional functional representation or through horizontal processes and value chains.

##### **Resource and Cost Modeling**

The standard product supports modeling of a large range of resource categories, including costs or processes, salaries of people, equipment required, and so on. Additionally, the product is extensible and allows users to define their own stereotypes for items. In this manner, diagram styles, user-defined properties, and more can be specified and overlaid on standard items within the tool.

##### **Mapping Organization Strategies to Performance Measures**

Holocentric Modeler provides a number of options for representing performance strategies and goals. These include value chain analysis and balanced scorecard. Other representations can be added. Each of these can be mapped to the process areas and processes, and the relationships built throughout the models are inherited up to the strategy level.

##### **Managing Process Portfolios**

Holocentric Modeler provides a convenient set of model-management utilities that allow processes to be managed across an organization. Processes can be assigned to catalogs and sub-catalogs to provide visibility over a subset of the total repository to suit specific needs. The process repository can be navigated through scripting programs that allow access to all information, with additional rules enforced.

Additionally, the process portfolio can be partitioned and work assigned to individuals. When completed, the work can be consolidated back into the repository.

### **3.2. Defining Processes**

#### **Defining Processes**

Holocentric Modeler allows users to define processes using a variety of techniques, such as Holocentric's role-based process maps (RBPM), using BPMN or via UML activity diagrams. You can also combine more than one method within a model. This allows users to visualize and communicate business processes and systems at the level of detail best suited to their audience and modeling goals.

Holocentric's role-based process models allow the user to define roles, activities, and the relationships between them, resulting in activities being defined that always have clearly defined roles, each with their own responsibilities. In performing an activity or task, people or systems fulfill roles. Roles are modeled using UML based actors. A process is a set of roles and activities that work together to produce a significant outcome that assists the business to meet its goals. Users create business process diagrams that illustrate how the roles and activities communicate to achieve the process outcome.

As noted previously, the roles form part of the organization structure, providing very capable impact analysis capabilities regarding the implementation of change and how this relates to people within the organization.

#### **Process Information Storage and Integrity**

Holocentric Modeler ensures that core rules are applied at the time the diagram and other items are created and as they are maintained so that process models are structurally correct. Further validation and efficiency checks can then be executed over models to ensure a high degree of consistency. Integrity is also maintained across the entire model when model elements are consolidated in a team environment. Validation rules can also be defined for user-defined meta-data, which helps ensure that user-specific information is also consistent.

#### **Graphical Notations**

Holocentric Modeler allows users to define processes, such as BPMN and other diagram types, including UML Class and Sequence Diagrams, using a range of in-built styles. Additionally, user-defined node and connection styles can be created to either override or be used in addition to the standard styles offered by the tool.

The ability to create user-defined node and connection styles means that existing notations can be either modified or extended, and that new notations can be incorporated within the product. Custom styles appear as additional diagram tools, resulting in seamless integration into the product.

Holocentric Modeler supports BPMN.

UML 2.0 Activity Diagrams are currently in development and are slated for availability as part of a Q4 2005 release.

### **3.3. Subprocesses and Activities**

#### **Handling Subprocesses and Activities**

Holocentric Modeler supports the nesting of processes and subprocesses down to individual activities, as part of the overall process model.

BPMN models offer the standard capability of nesting processes down to the task level, including the ability to display subprocess details as a graphic image within the higher-level process model element.

Holocentric's RBPM process models permit nesting of business process areas to any level, with processes containing activities forming the lowest level of a process area. The RBPM approach provides

a disciplined technique for associating management responsibilities directly with views of operational scope defined at consistent levels of abstraction.

Due to Holocentric's meta-model management capability, process elements defined in different types of models can be interrelated. For example, RBPM activities can be further decomposed into "sub work-unit" details, including UML Activity and Interaction Diagrams, System Navigation Diagrams, and BPMN processes. The ability to relate people oriented views of process with more detailed technology oriented views of process creates clearly traceable boundaries between these different process management stakeholder views.

### **Defining Activities**

Holocentric allows detailed information to be associated with the activities that are performed in the context of processes and process areas.

Various techniques are offered to support this association:

- Linking related items internal or external to the model. This may include documentation (such as work instructions, policies, procedures, training material, etc.), access to supporting systems, web services, reports, etc.
- User defined property groups can be associated with individual activities and classes of activities. By default, all activities hold information relating to resource consumption, activity duration, cost, and capability requirements.
- Activities can be related to data structures, such as business document definitions and supporting system interface definitions, to assist in forms design, data flow, and requirements specifications.

### **Documenting Decision Rules**

Decision points in Holocentric business process diagrams are denoted by a flexible combination of rules and decisions on process exchanges. As part of the product's process analysis features, the user can specify alternative combinations of branches on incoming and outgoing exchanges from roles and activities. These alternate combinations can be grouped into named cases, and simulations can be run against them. The user can augment decision rules with more detailed definitions, using rule facets, which are stereotyped UML classes.

### **Rules Entry**

Rules can be stored as text within dialog boxes. The content of the rules is implementation specific. Holocentric has developed a prototype for UML 2.0 Action Semantics, and these are expected to be released as a product during Q3 2005.

### **Activity Costs, Resources, and Time Data**

All of the information relating to activities and roles can be specified at a global model level and optionally overridden for individual diagram instances and, in some cases, user defined scenarios of process execution.

Furthermore, Holocentric enables information associated with activities (and, indeed, any model item) to be reused through specialization (i.e., inheritance) and user defined classification sets, such as geography, industry, and so on.

Performance metrics specified at different levels are then available for process execution simulations, queries, graphs, and interaction with Office productivity tools.

## **3.4. Simulation**

### **Simulation Capabilities**

Holocentric Business Modeler provides a Discrete Event process analysis capability that allows current processes to be analyzed, improvements simulated, and new processes to be identified.



Through the use of scenario-based process traversal definitions, performance metrics, including activity duration, lag times and volume, are incrementally considered to arrive at complete history graphs of an executed process scenario.

Problem areas can be easily identified – for example, activities that are too expensive, resource-intensive, high risk, or low reliability. Costs of processes, performance throughput, skills, and staffing requirements can all be determined. Metrics can be modified, such as the allocation of additional resources, the diverting of work down different paths, and changes in volumes of work. Improvements can then be tested and fine-tuned.

Monte Carlo type effects can be incorporated within the simulation model by applying weighted statistical outcomes for activity volumes and work routes.

The simulation capabilities delivered with the product are positioned for pragmatic, practical use by process managers and participants. For more advanced analysis by dedicated simulation professionals, scenario definitions and simulation results can be exported in XML format for use with more specialized simulation engines.

### **Analytic Capabilities**

Holocentric provides scenario definition facilities which enable users to define process execution scenarios and to incorporate and modify metrics associated with roles and activities for analysis. Multiple scenario definitions can be maintained in order to test different routing constraints and metric values.

Scenarios can be visualized within process diagrams to better communicate the activity paths under consideration.

Once scenarios are defined, the Modeler generates a scenario definition and execution history for use by subsequent analysis engines. The scenario definition describes all the processes, activities, and roles considered within the scenario as well as the definition of available execution paths through these elements. The execution history provides a chronological view of execution and the changes to metrics as they evolve over time.

Holocentric provides an Excel model with the tool which allows for comprehensive analysis of the definition and execution history to highlight resource utilization, key constraint areas, and estimated throughput and costing results.

The metrics associated with processes and roles are exported from the models along with the scenario definition and execution history information. These metrics can then be modified in Excel and the processing paths optimized. When the information is pulled back into Holocentric Modeler, the impact across the organization can be determined, and implementation can be planned, with a detailed understanding of how the changes will affect roles and supporting systems. (For more on integration with Excel, see Section 2.4 – Integration with Other Products.)

### **Real-time Data Utilization**

Holocentric Modeler can utilize a COM interface to extract information from operational systems, allowing modification of parameters such as average task duration, maximum and minimum times. Information from Activity Based Costing, as well as other user information, allows costs to be refined.

### **Model Distribution and Simulation on Enterprise Networks**

Holocentric Modeler offers a tiered approach to simulation execution and publication. Simulation definitions and execution histories are generated by the modeling tool for subsequent analysis. Simulation definitions and initial results are therefore easily distributed across an enterprise's network for further analysis or more widespread publishing of data in a dashboard.



The standard Excel analysis model which is shipped with the product can publish results to a portal such as SharePoint while the Modeler itself can publish scenario specific web site views of the processes and simulation results.

Finally, because path analysis exports via an open XML Schema, Holocentric is capable of interfacing with third-party simulation engines.

#### **Statistical Fit/Data Analysis**

The Excel simulation model that is shipped with the product assists with the application of Activity Based Costing utilizing the metrics defined for activities and resources maintained in the business model.

Simulation results which are imported back into a model can also be evaluated using Holocentric's Dependency Graph, which can be used in combination with the built-in scripting language to support Six Sigma evaluations of continuous process improvement.

The format of simulation results is suited to further analysis in database or other spreadsheet type statistical tools.

#### **Capture and Reporting of Simulated Metrics**

Holocentric Modeler provides pre-defined analytic reports and graphs from within the Excel analysis model that ships with the product. Additional reporting is available through the MS Word integration facility used in combination with the Modeler's native scripting capability.

## **4. Business Process Methodologies**

### **4.1. Business Process Methodologies**

Holocentric supports a range of methodologies that cater to the universal pattern of Discover/Analyze/Engineer/Manage type work cycles for the improvement of processes through the application of resources and the fulfillment of responsible, accountable organizational roles.

Various capabilities are available to assist Model users with the specific application of individual methods:

- **Balanced Scorecard** – Contains templates to help build models that can categorize and report on the evolution of strategies, objectives, perspectives, and measures. Measures which are defined through this process can then be associated with processes and activities to enable scorecard perspectives to be traced to process results.
- **Value Chain** – Derivatives of Porter's Value Chain methods are supported through the ability to cross-classify processes and the value streams which flow through process execution scenarios.
- **Rummler Brache** – Holocentric's RBPM business models emphasize the traceability of organizational responsibility and capability against process and activity performance. This feature offers a strong basis for the management of performance at the organizational, process, and job level. A number of Rummler's performance analysis diagrams are supported in the standard product.
- **Holistic Process Improvement** – Holocentric offers a general methodology for process analysis, decomposition, activity classification, and process improvement. This approach offers a common sense method that distills aspects from many of the methodologies popular at various times since the early Nineties.

### **4.2. Six Sigma Support**

Holocentric offers support for Six Sigma, providing templates and guidance for the use of the Modeler in Six Sigma applications. The Modeler offers a range of suggested properties and describes how to apply the general capabilities in the context of the DMAIC cycle.

## 5. Report Generation and Document Management

Holocentric Modeler provides flexible and fully customizable report generation capability. Reports can be based on a variety of template formats, including XML, HTML, RTF, and plain text. Reporting can be performed either in a stand-alone mode or else with other products, including Microsoft Office.

Standard reports include an HTML website, which is fully cross-referenced and includes text indexing. Many customers choose to publish the models (or parts of models) as navigable websites, which allow different views of the information, whether from a process perspective or role-based perspective.

Users can also publish models to external products, such as Microsoft SharePoint Portal Server, allowing role-based access to information. This enables employees to access details relating to business processes, roles, information requirements, and IT systems.

## 6. Development Environment

### 6.1. Language of Tool

Holocentric Modeler was developed in C#, C++, and Smalltalk.

A variety of design patterns have been employed in design and implementation of the product. They include facades, visitors, commands, MVC, and others. Such patterns help the product to be both maintainable and extensible.

### 6.2. Product Support, Maintenance, and New Versions

Product maintenance, from a user perspective, is managed by the product license key, the product itself, and Holocentric's on-line customer database. The Holocentric website allows customers with active maintenance to download and install the most recent product, which can be used with their existing license key. All updates are managed in this way. Downloaded products include a list of all enhancements in current and previous releases.

The following releases are planned for 2005:

- Q2 – Comprehensive support for path analysis and simulation
- Q3 – Enterprise Server repository, allowing the storing of all model information in a multi-user repository and the interfacing to third-party repositories through XML-based interfaces
  - Support for BPEL generation
- Q4 – Enterprise Explorer is to be enhanced with specific templates and methodology support, allowing users to integrate with modeling information and methodology enforcement without specific modeling expertise
  - Extended support for Visual Studio 2005
  - Support for Eclipse
  - Support for UML 2.0 Action Diagrams

## 7. Software Modeling and Code Generation

Holocentric Modeler supports the generation of code from UML class models. Add-ins are available for a variety of languages including Java, C#, C++, VB, VB.Net, Delphi, UDS (Forte 4GL), CA Advantage Gen, and Python.

Round-trip engineering is also supported, with language-specific code editors for most languages, resulting in a flexible approach to working with source code.

The product also has the ability for users to create their own template-based Code Generators. These generators can be used in place of the standard ones, where specific formatting and model-driven strategies are employed.

### **7.1. UML Model Generation**

Holocentric Modeler supports the creation of UML models and code generation from UML class models. Similarly, reverse engineered source code is translated into UML models.

### **7.2. BPEL Generation**

The flexible architecture of Holocentric Modeler allows rapid extension to support new languages and output formats, with BPEL currently under development and due for release in Q3 2005.

## **8. Templates and Frameworks**

Holocentric Modeler sports a number of techniques and features designed to support the creation and use of generic templates and frameworks.

### **Abstract Model Level Extensions through MDA**

Different model layers (relating to MOF) can be exposed by the Modeler to enable extensions to the standard meta-model. Through this facility, users can incorporate meta-models associated with external templates and frameworks at different levels of abstraction.

### **Process Element Inheritance**

All model elements may utilize multiple inheritance to associate standard template attributes with company-specific models. For example, a company can construct an “As Is” business model and then inherit from SCOR process framework elements to represent the “As Is” view in the context of the Plan/Source/Make/Deliver/Return of SCOR classifications.

### **Standard Prerequisite Libraries**

Models can be built which reference standard content administered in an external model. This ensures that standard reference models remain intact while the elements from these models are free for incorporation into client and project-specific implementations.

### **Model Patterns**

A universal pattern/template facility allows any model developed in Holocentric Modeler to be used as a model pattern. This approach offers a flexible method for adopting standard framework elements and then subsequently customizing them in ways not anticipated by the original framework.

By leveraging the facilities described above, Holocentric is able to offer a variety of horizontal and industry templates and frameworks licensed from standards organizations and developed by partners with domain expertise – as well as its own, internally-developed frameworks based on its extensive experience with government, service and wholesale/retail industries – for use with Holocentric Modeler.

### **Holocentric Enterprise Management Reference Model**

A horizontal business model template, the Holocentric Enterprise Management Reference Model covers common business elements for service, financial management, logistics, inventory control, procurement, sales and order processing.

### **ITIL Template**

The ITIL Template consists of processes and associated elements which support the IT Infrastructure Library IT Service Management.

### **SCOR Framework**

Holocentric provides a SCOR-based framework for associating customer-specific business models against standard SCOR views and benchmark performance measures.

### **AS 5090 Template for Work Process Analysis for Record Keeping**

Holocentric provides the AS 5090 Template for standard processes and associated elements which support the analysis of work for record keeping and, hence, for governance/compliance requirements.

## **9. Systems Administration and Security**

The Holocentric Modeler Team Add-In allows multiple users and multiple teams to work together on a project. It provides sophisticated capabilities for allocating work among team members, including the ability to lock model items for modification, while providing the consolidation capabilities to easily bring individual changes and additions back into the team model. Users can work independently, while having their work protected for quick consolidation into the common base team library. Team members can see who is working in related areas of the models, thereby allowing issues and conflicts to be identified earlier and resolved sooner.

The Team Add-In also provides administration and control capabilities designed to improve security and integrity over all model items. Users can divide work between team members, specifying who can update at the item level. Model managers can designate whether changes can be made by only the item owner or by any team member. Only the model manager (enforced via a specific user ID) has access to the team-controlled model for defining team members based on network logins.

Team members can create and restore from versions of their working models. Following consolidation of all team changes, the model manager reissues working models to team members.

A version of the team-controlled model can also be created by using a third-party document or configuration management system.

## **10. Scalability**

The Team Add-in allows small to large numbers of users to work side-by-side on the same model, across different networks and even across different time zones. Users can build up models using component model parts from prerequisite layers. This allows users to compose an enterprise model from individual models that correspond to distinct business and technical areas, yet, when combined, provide an enterprise view.

The Team Add-in also provides convenient consolidation utilities so that controlled user changes can be quickly and efficiently integrated into a single model.

With the addition of the Enterprise Server, the Modeler allows individuals to access model information transparently, either locally or over the Internet. Enterprise Server provides a scalable repository interface. The repository can use either Holocentric's own implementation or use a secondary interface to work with another vendor's repository.

Holocentric has customers with very large numbers of users, some with hundreds of modelers building process models and defining IT systems. The combination of file-based and service-based repository offers considerable opportunity for users to work in a practical, convenient, and scalable environment.

Holocentric currently supports simulation of complex models. Support for very large models, consisting of multiple interrelated models, will be improved through the introduction of Enterprise Server Repository in Q3 2005. As noted previously (see Section 3.4), it can interface with third-party simulation engines.

## 11. Platforms

Holocentric Modeler is available for Windows (98, ME, NT 4.0, 2000, XP or 2003). Installation of the latest available service packs is recommended. A minimum of 192 MB RAM is recommended for Windows 98 or ME, and 256 MB for NT 4.0, 2000, XP, or 2003. Approximately 50 MB of disk space is required for the complete client installation.

## 12. Pricing

List price for Holocentric Modeler is US \$1,500. This includes first year annual maintenance and support. Thereafter, annual maintenance and support is US \$250. Holocentric offers significant discounts for enterprise licenses. Maintenance and support includes unlimited support and all new updates and releases.

## 13. Company, Product Positioning, and Support

### 13.1. Company Background Information

Holocentric is a privately owned company based in Sydney, Australia. It began business in 1992 as Prism International – a vendor of custom Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) applications to small and medium-sized businesses. Prism recognized the need to base future systems on business process models. After attempting to develop process-modeling capabilities using Rational Rose and Microsoft Visio, Prism concluded that a more robust modeling capability was required. In 2002, Prism bought Adaptive Arts to acquire its IT systems design and business process modeling tools line, which the company had been developing and marketing since 1995.

In 2002, Prism re-focused its efforts as a vendor of business process modeling tools. This involved the re-branding of the company and product lines under the Holocentric name.

Holocentric has sold modeling licenses to over 2,000 customers worldwide and has licensed in excess of 25,000 users.

### 13.2. Positioning

Holocentric has positioned Holocentric Modeler to support a broad range of EA modeling and BP change activities, including

- Enterprise architecture modeling and analysis
- Process modeling and analysis, redesign, and improvement
- Detailed process modeling and analysis
- IT support/software development
- Human performance improvement initiatives
- Development of management and measurement systems

Holocentric Modeler provides capabilities for defining and modeling all of an organization's components and their associated relationships, including strategies and goals, organizational structures and functions, people and roles, business processes, and IT requirements.

Holocentric does not believe that products should be ivory-tower solutions, suitable for use by a small number of experts building corporate models. Rather, products need to be usable by end users as well as analysts and architects so that all can contribute based on their individual understanding and perspective. As a result, the company has made considerable effort via its tailorable role-based user

perspective features to ensure that Holocentric Modeler is accessible to both business users and more technically skilled analysts.

Holocentric also places a great deal of emphasis on the impact change has on people and the roles they perform. A key strength of the product is its ability to model organizations down through roles to people. This makes Holocentric Modeler well suited for supporting human performance improvement initiatives as well as the development of measurement and management systems. Finally, the ability to combine business modeling components with technology modeling components makes the product very useful for supporting IT engineering and software development efforts.

### **13.3. Product Training**

Holocentric offers a number of product training and support services, including

- Lifecycle and methodology integration
- Training programs, including BPM, Intermediate BPM, Advanced BPM, Lifecycle, Technology Modeling, Library Management, and Consolidation

### **13.4. Business Process Consulting**

Holocentric offers various business process consulting services and workshops, including those focused on

- Process improvement, including process path analysis, simulation, and process change
- Product customization services to support development languages, methodologies, frameworks, notations, and interfaces
- Product mentoring
- Team management and library consolidation

## **14. Case Study**

Holocentric Modeler was recently used by a large government agency to enable electronic lodgment of returns. This required the documentation of the business processes, from determination of the requirements for an IT application to support the lodgment process through to the technical design of the systems, applications development, testing, and implementation. The project involved approximately 50 people with roles varying from business analysts, designers and project managers to application developers. The project utilized an iterative development approach and was based on a development lifecycle that was incorporated into the Holocentric Modeler.

Some of the benefits achieved during the project were

- Very short installation time and learning curve, through the application of a pragmatic toolset supporting a team environment
- Improved communication between the business people and IT by utilizing a common model and standard documentation set
- Improved communication within the IT department through the incorporation of the development lifecycle within the modeling tool
- Building an infrastructure for future projects, verifying and improving the development lifecycle – from process analysis through user requirements to implementation
- Promoting a culture of re-use – building process models that could be utilized on future projects. Following the successful completion of the project, the tools have been deployed much more widely, and the process models developed in one business area are now shared and re-used in other parts of the organization.



**Holocentric****Holocentric Modeler, Version 4.4**

Total project duration was approximately 12 months and was one of the most successful projects ever conducted by this organization. It has since gone on to apply a similar approach on a number of other projects. More than 1,000 staff have been trained in the use of the Holocentric Modeler, and the product's use is ubiquitous in the organization.

Moreover, other companies and government agencies have adopted similar approaches, where they are using one tool set to keep track of business and technology models, linking them so that they can track requirements through to implementation.

## **15. Company Offices**

Holocentric has two offices in Australia, and it sells and supports its products globally through its Head Office in Sydney.:

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# ARIS Toolset

Version: 6.23

## IDS Scheer

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### 1. Product Overview

IDS Scheer is a leading provider of business process management related products and consulting services designed to support every phase of the business process management lifecycle, ranging from design, modeling, and analysis to implementation, monitoring, and optimization.

For business process modeling and analysis, and for enterprise architecture design, IDS Scheer markets the ARIS Easy Design and ARIS Toolset products. The former is an entry level tool intended primarily for users just getting started in business process modeling and analysis as well as for general (i.e., non-technical) business users. The latter is a high-end tool set that provides all the facilities and features required to support enterprise architecture and enterprise process management initiatives. This report focuses on the ARIS Toolset and its optional add-on components, which, together, enable the enterprise-wide, global definition and design of business processes as well as their analysis and optimization.

ARIS is also the modeling tool used by SAP and by most SAP developers, and the product includes a number of features that support SAP modeling and development. It's the only tool integrated into SAP NetWeaver.

Table 1 provides an overview of the ARIS Toolset (Version 6.23) and its main add-on components. The ARIS Toolset provides extensive features and functionality, ranging from repository-based process modeling and analysis to facilities for managing, configuring, checking, and reporting on business processes. It supports a large number of process methodologies and enterprise frameworks. Optional add-on components are available for simulation, Balanced Scorecard implementation, activity-based costing (ABC), and web-based design and publishing of modeled and optimized processes.

A number of templates and reference models are also available, including for SCOR, ITIL, Oracle, Microsoft Axapta, Financial Services, and Home Building. IDS Scheer also offers various industry frameworks and solutions for ARIS Toolset, including for Defense and Healthcare. Finally, ARIS supports paperless certification according to many well-known standards.

**Table 1. Overview of ARIS Toolset**

ARIS Toolset	High-end EA and BP modeling and analysis tool consisting of a large number of modeling, analysis, database/repository, and design components. Supports a wide-range of EA frameworks and methodologies. Add-on options available for simulation, web-based design, publishing, and communication, and Balanced Scorecard, Activity-Based Costing, etc.
ARIS Easy Design	Intuitive, entry-level business process analysis and modeling tools targeted at BP beginners and occasional users who document their knowledge in graphical models. Provides modeling, presentation, and reporting functions.
ARIS Explorer	Core management component of ARIS Toolset: Provides flexible navigation options for administering servers, databases, user groups, access privileges, fonts, method filters, models, and objects.
ARIS Designer	Graphical design tool for modeling/documenting business processes, organizational views, data and views, etc. Supports large models, multiple placement of objects, user-defined objects, scaling of object



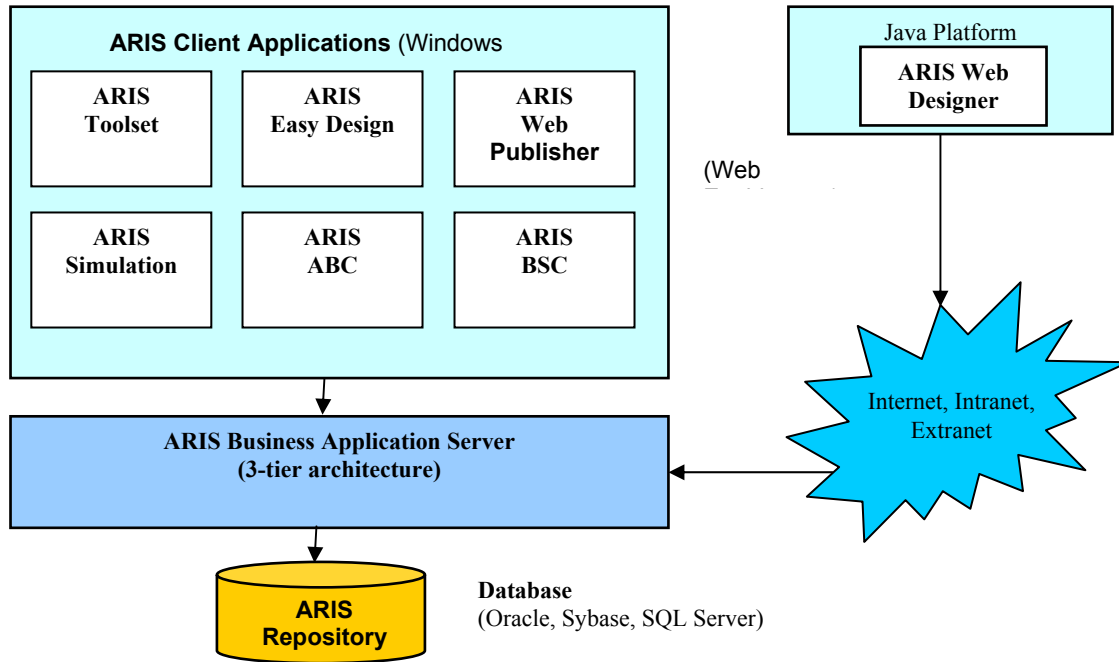
	occurrences, automatic layout generation, and automatic consistency/error checking.
ARIS Attributes	Central recording and editing component for ARIS Toolset. Allows users to conveniently enter the attributes of databases and all database content. Features a table structure of attribute editing – providing a quick overview of attribute values – and allows multiple items to be compared directly.
ARIS Configuration	Facility for configuring ARIS Toolset to meet organizational and end-user needs, including adapting methodologies and frameworks to special requirements and for defining filters and chart definitions. Provides import/export import capabilities.
ARIS Merge	Facilitates consistent merging of the contents of multiple ARIS databases/repositories into a single master database.
ARIS Change Management	Ensures that models are current and map business processes correctly. Actively incorporates business process models in improvement cycles so that documentation and analysis of continuous improvement are assured.
ARIS Model Generation	Model generation facility; users can generate new model views from existing database contents. Existing models or objects can be combined according to certain rules to generate new models that provide additional information. Source models and objects remain unaffected.
ARIS Identification	Facilitates unique identification of database items. (An identifier “abb: ID” can be assigned to each item in a database.) Identifiers can be used to show which groups have created specific items.
ARIS Consolidation	Supports shared modeling by managing versions of equivalent objects in different databases through merging and the creation of an object definition that is valid throughout the company.
ARIS Analysis	Provides KPIs for qualitatively assessing and evaluating processes modeled in ARIS.
ARIS Chart	Allows users to create presentation-quality business graphics on the basis of data stored in the ARIS Repository. Charts can be integrated into other applications.
ARIS Report	Facility for outputting database content in text or table format. Report Wizard allows users with no knowledge of the script language to generate their own reports. Reports output in XLS, DOC, RTF, TXT, and HTML.
ARIS Semantic Check	Model control facility that verifies models for compliance with certain rules to ensure that the business processes are mapped in ARIS logically and meaningfully. Only if models meet requirements are they processed further by other ARIS components (e.g., simulation.).
ARIS Variants	Using process variants, companies can, for example, define variants based on core practices that are tailored to the needs of different subsidiaries. Local differences are taken into account, but company-wide standards are preserved.
ARIS Web Designer	Add-on option for Web-based design and modeling of business processes. Typical users are technical departments. Provides intuitive GUI.
ARIS Web Publisher	Add-on option for publishing/distributing ARIS models via standard Web browsers. Access can be defined according to technical topic or role.
ARIS Simulation	Add-on option. Provides Discrete Event simulation and analysis capabilities, including object and attribute animation. Generates cumulative and detailed statistics of simulations and process efficiencies for display in ARIS Toolset or exporting to MS Excel, etc.
ARIS BSC	Add-on option. Supports rapid prototyping of Balanced Scorecard Systems. Includes structured methodology and project knowledge for selecting proper models, implementation, and visualizing and analyzing BSC data.
ARIS ABC	Add-on option for conducting Activity-Based Costing (ABC) analysis with ARIS Toolset.
Pre-built Models and Templates	Reference models: SCOR, ITIL, SAP, Oracle, Microsoft Axapta, Financial Services, and Home Building. Industry frameworks and solutions: Defense (DoDAF/C4ISR) and Healthcare. ARIS Scouts: Risk Management, Quality Management, Software Engineering, and Re-documentation of SAP R/3 applications. Packaged component solutions: ARIS for SAP NetWeaver; SOX Audit Manager.



**2. Product Architecture**

**2.1. Architecture Overview**

Figure 1 provides an overview of the ARIS Toolset architecture. ARIS has a flexible architecture that can scale from a single user to hundreds of users geographical dispersed. The ARIS Toolset and its accompanying modules and add-on components (e.g., Simulation, Balanced Scorecard, Web Publisher, etc.) run on Windows platforms and operate in a LAN environment. The web-based modeling and web-based viewing facilities are Java-based. The ARIS Web Designer can also function in a WAN environment. The ARIS Web Designer modeling tool works in either a LAN or WAN environments, and can run either in a browser, as a stand-alone application, or installed locally.



**Figure 1—Overview of ARIS architecture.**

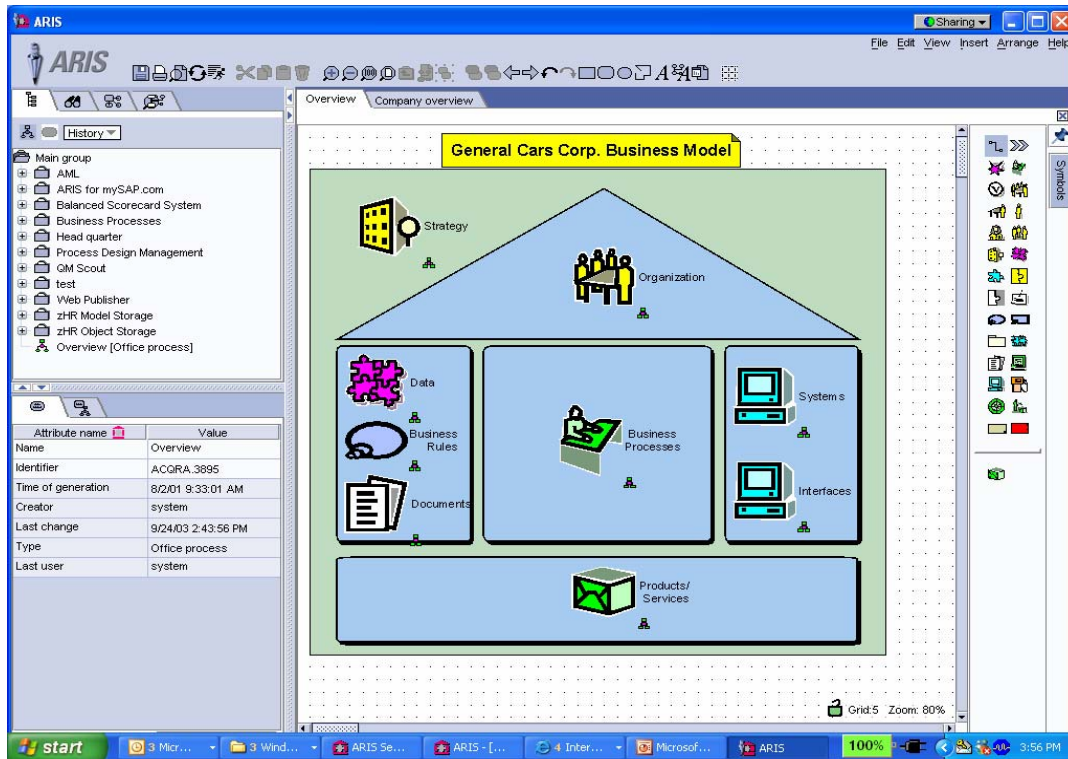
ARIS features a central repository, which can be accessed by multiple users and can be deployed in a development and production environment. ARIS repository data is stored in a Sybase, Oracle, IBM, or Microsoft SQL Server database. ARIS client components access the database (repository) server via the ARIS Business Server and are linked by high-speed network. It is also possible to use ARIS Toolset and ARIS Easy Design tools in single-user mode – a scenario primarily intended for desktop PC or notebook users.

**2.2. Usability and User Interface**

ARIS modeling tools support both general business users and technical analysts and IT personnel. ARIS Easy Design is intended for more general business users, while ARIS Toolset is targeted at more technical users like IT architects, project managers, and systems designers. However, all models created in various ARIS tools and components are connectable and shareable because they utilize the same repository.

Figure 2 shows the basic GUI for the ARIS Web Designer tool. This screen is displaying an overview of a fictitious company’s business model. By clicking on the various icons (e.g., “Strategy,” “Organization,” “Business Process,” “Data,” “Systems/Interfaces,” “Products/Services,” etc.) the user can drill-down to specific models and their associated information.





**Figure 2. ARIS Web Designer GUI.**

The ARIS GUI provides comprehensive design and navigation capabilities. Users can prepare models graphically or in text format. Full-screen mode and navigation options enable users to present data in a comfortable way, allowing design and modeling issues to be divided into clearly understandable sections, and large models to be viewed in their entirety. Users can also embed and link (OLE-capable) multimedia objects in their graphical models as additional information, allowing the integration of text, presentations, videos, or internet links into their process documentation.

The ARIS interface is also configurable, allowing users to define their own symbols and the appearance of objects, and to specify font and language capabilities used by the tool.

The ARIS design environment provides a number of features to assist users with creating process, organization charts, and other diagrams. These include automatic layout generation – including the multiple placements of objects as well as placement of attribute occurrences on several objects at the same time through multiple selections.

ARIS also has several features that provide behind-the-scenes “intelligence” for assessing and evaluating the quality of processes modeled in the tool. A semantic-checking facility ensures that as the user creates a model it will comply with established modeling conventions. In addition, an analysis module provides KPIs on the process-orientation of the organizational structure, on the integration of data and information, and on the degree to which the processes are integrated in the system. Figure 3 shows a process flow (in Swim Lane format) modeled in ARIS Web Designer.





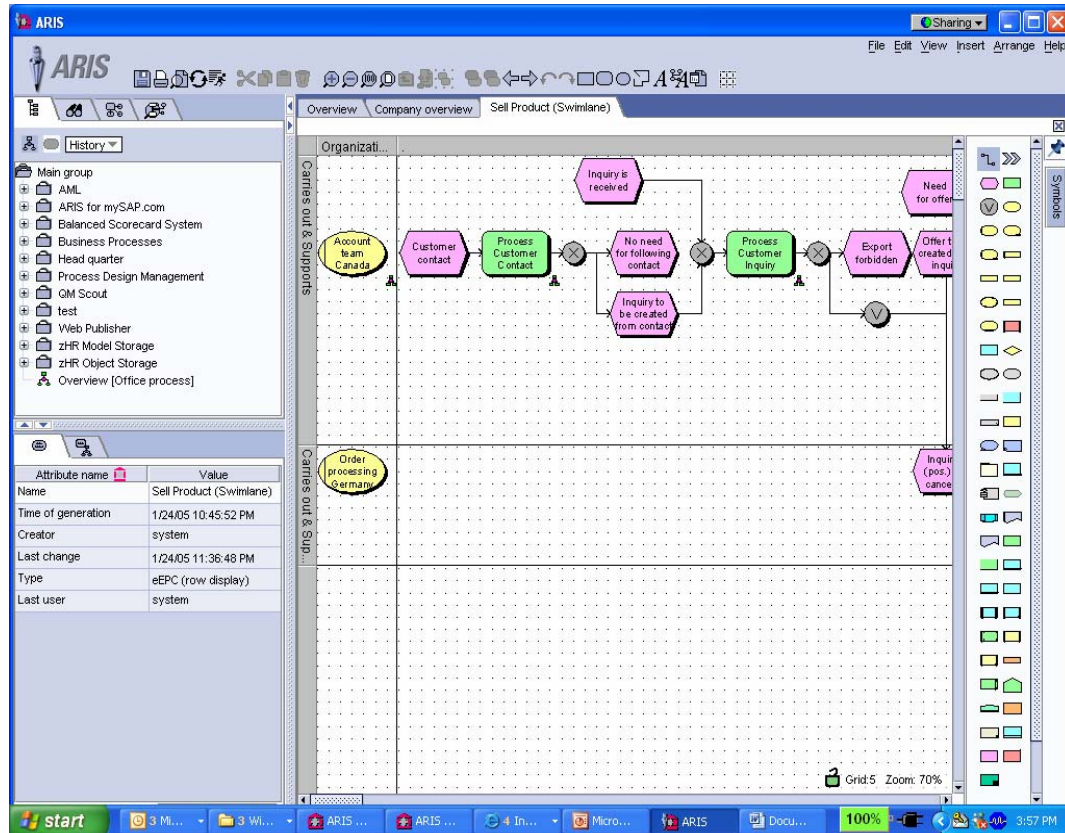


Figure 3. Process Flow Modeled in ARIS Web Designer.

**2.3. Repository Options/Team Development**

ARIS provides multiple capabilities for supporting team design and development. ARIS is repository driven, with all models and knowledge of business processes stored in the ARIS database repository, thus, ensuring maximum reusability of the data and models. The IDS Scheer folks refer to ARIS as having an “active repository” whereby all work or modeling takes place inside the repository. In other words, developers do not actually check out a model and then check it back in the traditional sense. Rather, when you open a model inside the repository, it is, in effect, “checked out.”

ARIS’s model-generation capabilities enable users to generate new views of existing models and other repository content. Users can combine existing models or objects according to specific rules to generate new models that provide additional information. For example, users might generate a function tree diagram from functions contained in multiple event-driven process chains (EPCs). Or, users could create an EPC from UML Activity diagrams. Importantly, source models and objects are not affected by this process.

Further team development support is provided by ARIS Web Designer, which allows users to design models in a standard browser, and ARIS Web Publisher provides role-based web access of models to employees via the internet.

Finally, ARIS Toolset features multilingual functionality for supporting international project teams.

**2.4. Integration with Other Products**

ARIS Toolset offers various APIs and import/export formats for integrating and exchanging data with other products. In addition to XML export and import capabilities, ARIS can import process models





from txt, XML, Visio, BPEL, and Excel, as well as from popular case tools like IBM Rational Rose and ERwin. ARIS also provides an Active-X-API for exporting and importing information from the toolset.

Users can also use BPEL imports to transfer business scenarios and business processes from SAP XI to the ARIS database. This interface is available for ARIS for SAP NetWeaver 6.23.

Finally, IDS Scheer offers consulting services for custom interface development. And Reischmann Informatik offers several third-party interface solutions for ARIS as well.

### **3. Analysis and Process Modeling**

#### **3.1. Enterprise and Organization Models**

##### **Enterprise Architecture Models**

ARIS is one of the few tools on the market that supports all of the major frameworks, including Zachman, TOGAS, FEA, DoDAF, and C4ISR. In addition, ARIS features its own proprietary framework known as “ARIS House.”

ARIS Toolset also features a configuration component that allows users to customize frameworks and methodologies to meet the specific framework and methodology needs of their organization by creating filters or templates (See Section 3.2.3).

##### **Organization Models**

Organizational units, data objects, application systems and information carriers can be modeled within processes in ARIS, along with events and functions.

##### **Resource and Cost Modeling**

ARIS allows users to model a range of resource categories – including equipment, human, consumable, and services. Users can also define cost, schedules, and usage patterns as well.

##### **Mapping Organization Strategies to Performance Measures**

ARIS offers several options for representing performance strategies and goals, including Balanced Scorecard. End-user organizations can also add other representations to suit their needs.

The ARIS Balanced Scorecard (BSC) option supports the documentation and analysis as well as the integration of strategic objectives, critical factors, and key data and measures necessary for implementing a balanced scorecard solution. A variety of options are offered. These range from the basic planning and documentation of a Balanced Scorecard to prototype development and the transfer of the information via Excel interfaces. Also supported are the analysis of cause-and-effect relationships and the calculation of actual values and a comparison with target values as well as immediate detection of deviations.

##### **Managing Process Portfolios**

Process portfolios are managed in the ARIS Repository, which can handle up to hundreds of thousands of processes. A complete description of the enterprise processes is captured in the ARIS tool set, including metrics, people, systems, and data.

#### **3.2. Defining Processes**

ARIS offers several ways to model processes, with each method applying semantics that enforce process integrity. The user can model the process flow, process rules, actor, systems, inputs and outputs, and other resources needed in the process.

##### **Define Processes**

Processes are defined using ARIS Designer or ARIS Web Designer – graphical design tools for modeling and documenting business processes, organizational views, and data. Users can also define process models in text format.

### **Process Information Storage and Integrity**

All models are stored in the ARIS repository. In addition, ARIS's semantic model control capability ensures that models are checked to verify they comply with specific rules. This helps to ensure that the processes are mapped in ARIS logically and meaningfully. Only if models meet certain requirements are they processed further by other ARIS components, such as ARIS Simulation or ARIS Balanced Scorecard. (For more on ARIS Repository features and system administration/security, see Section 2.3.)

### **Graphical Notations**

ARIS supports over 144 notations for modeling processes, data, systems, organizations, products, and services.

Users can also create tailored notations and frameworks. This is accomplished using the ARIS Configuration component, which provides facilities for configuring ARIS Toolset to meet organizational and end-user needs. For example, by creating the appropriate filters, end-user organizations can adapt the ARIS Methodology to special requirements (e.g., rename model types, object types, symbols, attribute type groups, etc.). Users can also define templates that influence the appearance of objects and connections. (Templates can be assigned to specific models in ARIS Explorer or ARIS Designer.)

In version 6.2, ARIS offers BPMN as an additional modeling notation. This method can now be used in conjunction with the other ARIS methods available.

A UML Design component that supports all UML methods, including UML 2.0 Activity Diagrams, is available for ARIS Toolset. (For more on ARIS' UML capabilities see Section 7.1.)

## **3.3. Subprocesses and Activities**

### **Handling Subprocesses and Activities**

ARIS provides a drill-down capability for representing and managing subprocesses.

### **Defining Activities**

ARIS offers multiple drill down levels all the way down to the activity level. Using the function object, a user can depict activities. Alternatively, one can use the Activity diagram to show actors and activities.

### **Documenting Decision Rules**

In ARIS, decisions are defined using the logical operators and events.

### **Rules Entry**

Business rules can be depicted in the form of events and operators to show process rules; other rules can be shown as separate rule objects in the model.

### **Activity Costs, Resources, and Time Data**

ARIS methodology allows the storage of cost, resource, and time data with activities.

## **3.4. Simulation**

### **Simulation Capabilities**

The ARIS Simulation add-on option features a Discrete Event engine that provides a number of simulation capabilities, including the ability to define and run multiple process scenarios and the ability to run graphical animations (both object and attribute animations).

### **Analytic Capabilities**

For individual processes, the following data can be determined by dynamic simulation:

- Executability of the process, process weak points, resource bottlenecks, and so on
- Process duration that considers available resources for this process and other resources
- Execution frequency of a process within a given period
- Use of employees, organizational units, and other resources by certain processes

- Capacity development of used and consumed materials as well as finished products
- Wait times of the processes, resulting from employee and other bottlenecks
- Localization of the process weak points
- With the simulation of target processes, you can forecast the actual effect of planned restructuring

#### **Real-time Data Utilization**

ARIS Simulation does not interact with operational systems; however, IDS Scheer's Solutions Groups can build such an interface.

#### **Model Distribution and Simulation on Enterprise Networks**

ARIS offers a full process discrete event simulation. The simulation can be run on high-level models that represent enterprise process flows. The simulation can also be run on the server.

#### **Statistical Fit/Data Analysis**

ARIS provides some analysis capability to analyze the process, using the simulation tool and the Process Cost Analyzer. The simulation engine produces various statistics from each simulation run that can be taken into statistical analysis tools like MINITAB.

#### **Capture and Reporting of Simulated Metrics**

ARIS's animation features allow users to (visually) determine first results and tendencies during the simulation itself. Visual changes to individual objects during the simulation may immediately indicate whether or not process branches are ever run through. While attribute animation provides more detailed information about the state of individual objects, indicating, for example, the number of times a function is carried out at a certain point in time.

ARIS also generates cumulative and detailed statistics of simulations and process efficiencies, and the statistics can be displayed online (in real-time) in the form of charts, tables, and other diagram formats. Users can also export simulation results and statistics to Excel for further analysis, formatting, and publishing.

## **4. Business Process Methodologies**

### **4.1. Business Process Methodologies**

“ARIS Value Engineering” is the principal IDS Scheer methodology for business process management. The ARIS methodology includes over 140 model types and hundreds of objects. Users can also modify the appearance of objects.

In addition, ARIS Concept provides a guideline for developing, optimizing, and implementing integrated application systems. At the same time, it shows business administration specialists how to view, analyze, document, and implement information systems. This ARIS Concept approach is broader than just systems development. It supports enterprise architectures, business process improvement, and compliance. It also includes some standard approaches, as well as proprietary approaches.

### **4.2. Six Sigma Support**

IDS Scheer does not offer a specific Six Sigma add-on package for use with ARIS Toolset. However, the company does offer a training program designed to support a Six Sigma model-driven solution. This includes a 5-day-workshop covering the Six Sigma concept as well as IDS Scheer's Six Sigma product portfolio.

## 5. Report Generation and Document Management Capabilities

ARIS includes a GUI for users to evaluate and run reports at the group, model, or object level. Users can also use a Report Wizard designed to assist in creating a report by accessing report scripts included with the ARIS package, or that have been created (i.e., user-defined) with ARIS Script Editor and ARIS Script. ARIS includes 90 standard reports, which users can modify.

The ARIS Report component allows you to evaluate selected database contents in text form. Evaluations can be created as files of various formats, which users can edit further, using standard applications such as Word, Excel, or an HTML editor. Users can also export model graphics in such formats as WMF, GIF, JPG, and BMP. Some reports can also write data to ARIS databases. In addition, database contents can be output automatically for translation, and translated texts can be entered back into the database.

The ARIS Chart components assists users in creating charts and graphics that are presentation ready on the basis of data stored in the ARIS repository. ARIS includes a large number of chart types. Users can also define templates to set up chart definitions that can be used to display issues and the relationships between issues in a format suitable for presentation. These charts can also be integrated in other applications.

With ARIS, users can also create knowledge management models by using a knowledge object to indicate knowledge. In these knowledge objects, the user can link to external sources (e.g., documents, URLs, or knowledge management systems, etc.) so that external documents can be triggered from the model.

## 6. Development Environment

### 6.1. Language of Tool

The ARIS Toolset is written in C++. The Web Designer and Web Publisher components are written in Java.

### 6.2. Product Support, Maintenance, and New Versions

Users on maintenance are provided with support via email or phone. They can also access a FAQs knowledgebase on the IDS Scheer website.

Users with updated maintenance receive all product upgrades at no charge. Updates and patches are provided as needed and can be downloaded from the IDS Scheer FTP server.

## 7. Software Modeling and Code Generation

An optional component is available – ARIS UML Designer that is designed to support business-driven software engineering efforts by linking process models (in ARIS Toolset) with technical (UML) models. Typical users include software development engineers and managers.

UML Designer is fully integrated with the ARIS Toolset (i.e., shares the same repository) and can access the process modeler's data directly. Thus, multiple users at different locations can process the same data with both ARIS UML Designer and ARIS Web Designer. UML Designer fully supports all UML modeling methods as well as the Object Management Group's (OMG) Model Driven Architecture (MDA) framework.

UML Modeler also provides quality assurance capabilities through online consistency monitoring. This active modeling capability monitors and detects syntactical and structural modeling errors. Users can

then transfer tested models from ARIS to third-part software design/development environments via XMI, where they can be used to generate program code.

### **7.1. UML Model Generation**

The UML Designer component fully supports all UML diagrams.

### **7.2. BPEL Generation**

ARIS version 6.2 can import BPEL; however, ARIS version 7.0 (available 2QTR 20045) will be able to export BPEL.

## **8. Templates and Frameworks**

IDS Scheer offers a number of reference models and industry templates and solutions for the ARIS Toolset, including

- SCOR reference model
- ITIL reference model
- SAP reference model
- Oracle reference model
- Microsoft Axapta reference model
- Financial Services reference model
- Home building reference model

### **SOX Audit Manager**

A SOX Audit Manager is also available for ensuring Sarbanes-Oxley compliance. It includes the following:

- Structured method and integrated procedures
- Maintenance of master data only in ARIS (i.e., no redundant data maintenance)
- Fast implementation and maintenance of the management system due to synchronization with ARIS
- Operational support for necessary tests within processes. In addition to documenting the risks and controls in the process, one can also document the test activities that need to be performed to validate the controls.
- Hassle-free production of documentation for auditors

### **ARIS Defense Solution**

This is a professional tool for enterprise architectures supporting DoDAF/C4ISR. ARIS Defense Solution enables organizations to optimize enterprise architecture management based on the DoDAF and C4ISR.

### **ARIS Healthcare Solution**

ARIS Healthcare Solution is a process management tool custom-tailored for the healthcare industry. It enables the concise graphical representation of complex medical treatment processes as well as interactions across hospitals. It supports creating an optimal view of treatment paths and costs to support Case Management and Disease Management. ARIS Healthcare Solution also makes allowances for quality assurance; it can serve to minimize organizational risks considerably.

### **ARIS for SAP Netweaver**

Formerly known as “ARIS for MySAP,” ARIS for SAP Netweaver works with ARIS to enable process-oriented implementation of SAP applications. Benefits include linking of business processes with SAP

transactions, integration of enterprise requirements and customization, integration of SAP implementation tools, process-oriented user training sessions, and creation of user profiles.

#### **ARIS Scouts/ARIS Scout Generator**

IDS Scheer offers a number of “ARIS Scouts.” ARIS Scouts embed expertise that IDS Scheer has accumulated from consulting projects into methodologies designed to support specific domains, applications, and industries. ARIS Scouts are available for Risk Management, Quality Management, Software Engineering, and Re-documentation of SAP R/3 applications.

A “Scout Generator” component is also available that allows users to capture and package project expertise into Scouts. Scouts can then be used – in conjunction with ARIS Toolset – for subsequent projects. IDS Scheer uses Scout Generator to create its own Scout products. It is also popular with end-user companies and consultancies that wish to package their own expertise into a methodology and tool set.

### **9. Systems Administration and Security**

ARIS Toolset provides a number of administration and security features. These range from the modeling and semantic-checking features associated with the design and development tools (discussed previously) to a controlled review environment and data storage, documentation, and release lifecycle management capabilities.

**Management.** Core management capabilities for ARIS Toolset are provided by ARIS Explorer. ARIS Explorer provides navigation options and enables users to administer servers, databases, user groups, access privileges, fonts, methodology filters, models, and objects.

Models and objects can be displayed in the Explorer so that the user can control the degree of complexity of the display. In addition, assignments to models can be shown in a concise and convenient manner.

The authentication of users via LDAP (Lightweight Directory Access Protocol) enables efficient administration of access privileges, particularly for large application scenarios.

**Shared Modeling.** To avoid conflicts and inconsistencies among versions of equivalent objects (maintained in different departmental databases), the ARIS Consolidation facility is used for merging objects and for creating an object definition that is valid throughout the organization.

A merge facility is also available that allows consistent merging of the contents of multiple databases into a single master database. This feature is important because, in multi-user mode, operational departments can enter their business processes in different databases. The ARIS Merge facility allows users (i.e., typically a coordinating office or group) to merge the content of varying databases – including those residing on different servers – to form one master ARIS database. ARIS Merge recognizes identical items when conducting a merge, allowing the user to decide which item(s) to transfer.

**Change Management.** The ARIS Change Management evaluation component helps ensure that models are current and that business processes are mapped correctly. Basically, this component functions by incorporating process models in improvement cycles so that documentation and analysis of continuous improvement are assured. Proposals for change and improvement can be made for all objects and models in the ARIS database/repository.

Basically, model users enter their proposals for improvement directly into the ARIS database/repository, with or without consulting a process manager. An improvement manager receives an overview of all improvement proposals via corresponding database items in the ARIS Explorer tool. Model users see the proposals for change and improvement in attribute editing. The improvement manager receives information on all improvement proposals and their status. Based on this information, he or she can



assign tasks to responsible parties. Modelers automatically receive notification of the tasks assigned to them, and the process manager is responsible for the implementation of the modified process. Thus modeled processes are evaluated and change measures initiated for them where they are actually being executed. In this way, process analyses with ARIS Toolset provide a constant stream of current results that are pertinent for decision making. Reports are used to make the improvement information available outside the program as well.

**Release Lifecycle Management.** ARIS Toolset features a release lifecycle management capability that allows the tracking of complex process release cycles. The release cycle commences with a formal review of the model status by a coordinator in the development environment. The process manager who receives the results of this review checks the contents and then passes the model and project information released to a protected release environment and also back to the development environment.

## 10. Scalability

ARIS can scale from a single user to hundreds of users that are geographical dispersed. It has a central repository that can be accessed by multiple users and can be deployed in a development and production environment.

The ARIS simulation engine can simulate large complex models and can also simulate linked and inter-related models.

## 11. Supported Platforms

ARIS Toolset and its components can run on several platforms.

### Supported Client Platforms

Supported client application platforms include Windows NT, 2000, 2003 and XP Professional.

### Supported Client Browsers

Supported client browsers include Internet Explorer (version 4.1 or higher) and Netscape Navigator (version 4.01 or higher).

### Supported Relational Database Platforms

Supported relational database platforms include Windows NT, 2000, 2000 Advanced, IBM AIX, and Solaris.

## 12. Pricing

Pricing for ARIS Toolset starts at US \$2,500, with the pricing varying, depending on which components the customers wish to access. Site licenses are also available. Standard pricing is on a per-user basis.

## 13. Company Product Positioning and Support

### 13.1. Company Background Information

IDS Scheer is a leading provider of business process management and IT products and services. The company has spent the past 20 years dedicating its R&D efforts and services to business process management. In 1992, it introduced the ARIS Toolset. Today, IDS Scheer's products and services cover the full lifecycle of enterprise architecture and business process management.

In addition to strongly focusing on offering products and services to help companies with SAP implementation, IDS Scheer offers a range of products and consulting services targeting various industry

verticals – including consumer packaged goods, pharmaceuticals, automotive, chemicals, retail, and software development.

IDS Scheer was founded in 1984. The company is headquartered in Germany and has subsidiaries in 22 countries with representation in over 50 more. IDS Scheer has over 2,200 employees, including over 150 developers. Approximately 800 employees are dedicated to the ARIS line, while another 800 or so are involved in ERP consulting and use ARIS to conduct these projects.

IDS Scheer has seen growth every year since its inception. For 2004, IDS Scheer reported revenues of US \$300 million.

### **13.2. Positioning**

IDS Scheer has positioned ARIS Toolset to support the entire range of EA modeling and BP change activities, including

- Enterprise architecture modeling and analysis
- Process modeling and analysis, redesign, and improvement
- Detailed process modeling and analysis
- IT support/software development
- Human performance improvement initiatives
- Development of management and measurement systems

IDS Scheer has been a leader in business process management for almost 20 years – both in product offerings as well as consulting services. As a result, the company has amassed extensive experience and expertise in all areas of business process management. This shows in the ARIS Toolset, which provides a wide-range of features and functionality necessary to support the full breadth of enterprise architecture and business process management requirements. This experience also shows in the constant addition of new capabilities to the toolset, enabling IDS Scheer and its offerings to remain at the forefront of the market. (As an example, with its Web Designer component, which has been available for almost 5 years, IDS Scheer was one of the first companies to market a web-based business process analysis and modeling environment.) Today, IDS Scheer is heavily focused on packaging its considerable expertise in the form of process content for use with ARIS in order to offer customers pre-configured solutions for specific industries and applications.

When combined with its various optional components, the ARIS Toolset offers one of the most comprehensive platforms available. In short, ARIS covers the full spectrum of business process modeling, simulation and analysis, optimization and enterprise architecture, and IT architecture design, making it suitable for modeling the entire organization. In addition, the large number of supported frameworks and methodologies (over 140+) make ARIS well suited for almost any modeling effort, including human performance improvement initiatives and development of Balanced Scorecards and other management and measurement systems. Likewise, when used in conjunction with UML modeling components, ARIS provides the ability to support IT and software development efforts, too. Finally, the availability of various reference models and industry templates provides a quick way for organizations to “jump start” various process and IT initiatives like SCOR, ITIL, financial services, healthcare, homebuilding, SAP, Oracle, and Microsoft Axapta efforts.

### **13.3. Product Training**

IDS Scheer offers numerous training sessions and workshops oriented toward ARIS tools and business process management, in general. These include a management workshop on “Strategic Business Process Management” and various ARIS training courses:

- Creating and analyzing models with ARIS Toolset

- Creating and analyzing models with ARIS Web Designer
- ARIS Balanced Scorecard
- Dynamic simulation with ARIS
- ARIS Web Publisher customization
- ARIS Report Script customization
- Conducting ARIS projects successfully
- Integrated BPM with ARIS (BPL)
- Process-oriented ISO certification with ARIS

#### **13.4. Business Process Consulting**

IDS Scheer offers extensive consulting solutions for SAP, Enterprise Application Integration (EAI), Business Intelligence, and Business Process Reengineering.

The company's industry-specific expertise covers the automotive industry, capital goods industry, chemical and pharmaceutical, consumer goods industry and retail, financial services, media, metals industry, paper industry, public sector, telecommunications, textile industry, transportation and travel, and the utilities sector.

#### **14. Case Study**

TVNZ offers two of the most successful television stations in New Zealand – TV ONE and TV2. At the end of 1999, TVNZ decided to analyze its business processes in order to increase transparency in the fast growing company. A new “Business Process Improvement” task force was created. This team consisted of eight project members with experience from different areas of TVNZ.

The main objectives of TVNZ's business process improvement initiative included

- The top-down description of the current processes on different levels of abstraction
- The analysis and improvement of core business and support processes
- The Intranet-based distribution of process-relevant information
- Simulation of selected processes

Overall, the team aimed to increase the awareness of TVNZ's business processes.

The modeling of the business processes started in January 2000. Up to six modelers in parallel designed value-added chain diagrams and event-driven process chains (EPCs) for TVNZ's core business processes.

Utilizing ARIS, the “as-is” model was documented, based on the traditional use of videotape, while the “to-be” model included digital production via servers. Thus, journalists and editors would be able to work independently of tape in a non-linear environment. The effects of the change were evaluated using a simulation that focused on the utilization of the servers. Different types of stories (e.g., foreign stories, sports stories, etc.) were taken into account and the effects on the server capacity were carefully evaluated. Based on ARIS Simulation, it was possible to ensure optimization of the huge investment planned for new technology.

The intensive work quickly led to positive results like a new and more complete understanding of TVNZ's business processes and the identification of weaknesses. However, the number of process models increased very quickly. Thus, it was obvious that further concepts for the management of the fast growing process model complexity were necessary. The approach adopted was to design an individual business framework for TVNZ. This framework required a process focus; had to represent on a high level of abstraction the entire business; and had to be flexible regarding changes in the business

(e.g., increased internet market, etc.). The final developed framework now serves as an intranet-based access point to all of TVNZ's business process models.

## 15. Company Offices

Headquarters of IDS Scheer Global are in Saarbruecken, Germany, the North American Headquarters are in Philadelphia (Berwyn), PA. Subsidiaries of IDS Scheer are in Germany (Saarbrücken, Berlin, Düsseldorf, Frankfurt, Hamburg, Munich, and Nuremberg) as well as in 20 further countries, including Great Britain, France, USA, Canada, Brazil, Japan, Russian, Singapore, and others within Central and Eastern Europe. Please contact the IDS Scheer website for a complete list of subsidiaries.

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## **iGrafx**

Version: 10.0

## **iGrafx**

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### **1. Product Overview**

iGrafx markets a number of process analysis products and services under the collective name of iGrafx. The iGrafx products provide a common interface and tool set designed to support various initiatives associated with business process modeling and analysis, including Six Sigma, Lean, ISO, and BPM deployment. Together, the iGrafx product line offers an integrated suite of tools that enable organizations to document, analyze, optimize, and manage their processes.

As shown in Table 1, iGrafx consists of five main products and additional interface options. Figure 1 helps explain their functionality. Each iGrafx product integrates with other products in the suite. When combined, they provide a comprehensive team-based collaborative process visualization and analysis environment designed to bridge the gaps between the three major process constituencies: IT departments, business analysts, and process initiative practitioners. All iGrafx products allow you to export files for presentations, Web viewing, publishing, and annotation of diagrams, models, and other associated process information.

iGrafx Flowcharter is a professional business diagramming tool that allows users to create hierarchical process maps, flowcharts, and other related diagrams directly relevant to process improvement, and Lean and Six Sigma efforts.

iGrafx Process provides mapping and modeling capabilities, and features an engine for simulating business processes. This business process analysis and simulation tool is designed for experts and non-experts alike. It provides simulation, advanced visualization, analysis, modeling, and reporting.

iGrafx Process for Six Sigma is an enhanced version of iGrafx Process specifically designed to support business process diagramming, modeling, analysis, and simulation for Six Sigma initiatives. It also features the ability to tightly integrate with the MINITAB and JMP statistical analysis packages (available from third-party vendors). iGrafx Process for Six Sigma allows for swimlane® process mapping, intuitive design of experiment (DOE), and data fitting.

iGrafx IDEF0 is a structured diagramming tool designed to help IDEF0 practitioners create IDEF0-compliant diagrams that visualize complex technical subjects and create complex systems models. IDEF0 diagrams can link directly to swimlane process maps for a comprehensive means of capturing knowledge from the system level down to the process steps.

**Table 1. Overview of iGrafx**

iGrafx Flowcharter 2005	Professional business diagramming and visualization tool. Provides diagramming, hierarchical process mapping, modeling, automatic swimlanes and automated HTML Web export capabilities. Supports Six Sigma, Lean, ISO, Sarbanes-Oxley, BPMN, and BPM initiatives. Enables users to create hierarchical process maps, flowcharts, HR charts, and other related diagrams directly relevant to process improvement and Six Sigma. Diagrams provide clear, visual representations of how work gets done across the organization, thereby providing a crucial understanding needed to communicate and improve business processes. Flowchart diagrams of all types can be posted to the Web or company intranet. Integrates with other iGrafx products.
iGrafx Process 2005	BPA and simulation tools designed for experts and non-experts. Provides simulation, advanced visualization, analysis, modeling, and reporting. Supports Six Sigma, Lean, ISO, Sarbanes-Oxley, BPMN, and BPM. Integrates with other iGrafx products.
iGrafx Process 2005 for Six Sigma	Extended version of the iGrafx Process BPA tool specifically designed to support Six Sigma projects. Provides swimlane process mapping, intuitive design of experiment (DOE), simulation and seamless integration with the JMP and MINITAB statistical analysis tools for Six Sigma. Provides facilities for sharing process and project knowledge through instant presentation and HTML Web publishing. Integrates with other iGrafx products.
iGrafx IDEF0 2005	Easy to use diagramming tool designed to help IDEF0 practitioners to create IDEF0 compliant diagrams, visualize complex technical subjects, and create complex systems models. IDEF0 diagrams can link directly to swimlane process maps for a comprehensive means of capturing knowledge from the system level down to the process steps. Other features include an <i>Explorer</i> for visualizing and navigating complex models and a Web export facility. Integrates with other iGrafx products.
iGrafx Process Central 2005	Optional server-based repository that manages, tracks, and enables sharing of process documentation; provides a team-based collaborative groupware application for enterprise process initiatives including advanced document control, security, publishing, collaboration and rights management. Useful for Six Sigma, Lean, ISO, Sarbanes-Oxley compliance, Basel II compliance, TQM, and BP improvement initiatives. Integrates with other iGrafx products.
iGrafx BPEL Interface	Add-on component that provides the ability to generate BPEL from diagrams (e.g., process maps, models created in swimlane, and BPMN notation) created in iGrafx tools. Functions as an extension to any iGrafx process analysis and modeling product.

iGrafx Process Central is a server-based repository that manages, tracks, and enables sharing of process documentation for team-based collaboration and enterprise business process management initiatives, including advanced document control, security, publishing, collaboration and rights management, web access, and e-mail notification.

The iGrafx BPEL interface option is also available, which provides the ability to generate BPEL from swimlane and BPMN diagrams created in any iGrafx process analysis and modeling product.

All iGrafx products can be used separately or together.





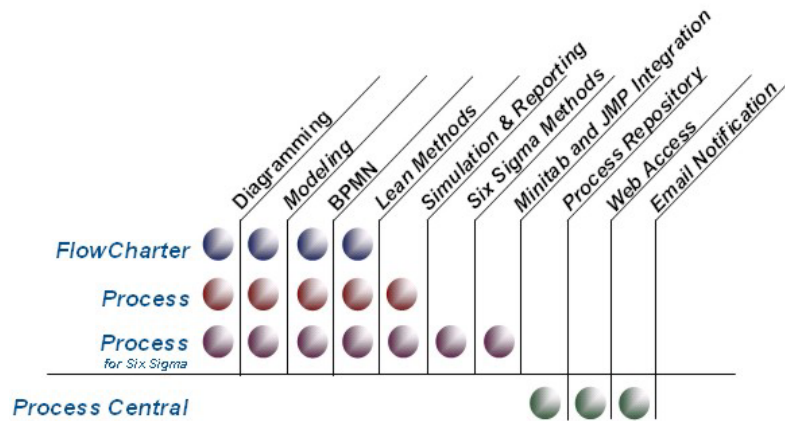


Figure 2. iGrafx Product Hierarchy.

## 2. Product Architecture

### 2.1. Architecture Overview

Figure 2 describes the general iGrafx architecture and shows the relationship between products. iGrafx Process contains all iGrafx FlowCharter capabilities plus simulation features. iGrafx Process for Six Sigma includes all iGrafx Process features plus integration with third-party statistical analysis tools. The iGrafx IDEF0 add-on and iGrafx Process Central server-based repository are also shown. The latter is an option for companies seeking to establish a centralized process repository/infrastructure that can support enterprise process initiatives. A common UI and file format is used by all client products. Only iGrafx Process for Six Sigma is integrated with MINITAB or SAS JMP statistical analysis tools.

The iGrafx Server components enable the use of iGrafx Process Central Repositories, and include:

- Server Administrator – for creating repositories and managing end-user accounts
- Web Central – allows browser-based viewing and annotation of repository documents
- Mail Central – for email notification of document approval requests
- Database – for hosting repositories

The iGrafx Server components and their interaction with the iGrafx desktop applications and iGrafx Process Central Repository are discussed in greater detail in Section 2.3.

### 2.2. Usability and User Interface

iGrafx process analysis tools are designed to support the needs of the different process constituencies while ensuring a common environment for capturing, sharing and managing critical process knowledge—including Web publishing.

The iGrafx user interface provides an intuitive, Windows-compliant GUI. A number of “smart” features allow users to quickly create diagrams graphically. These include model design wizards, “correct-by-construction” enforcement facilities (e.g., to enforce methodologies like IDEF0 and BPMN), customizable model templates, and post-design validation capabilities. Additional features for creating process map hierarchies, multi-page diagrams, and links to external documents and programs help to enhance process documentation. Other ease-of-use and productivity-enhancing features include automatic line routing, diagram links, “auto-grow shapes,” swimlanes, and the ability to work with multiple pages in a single window.

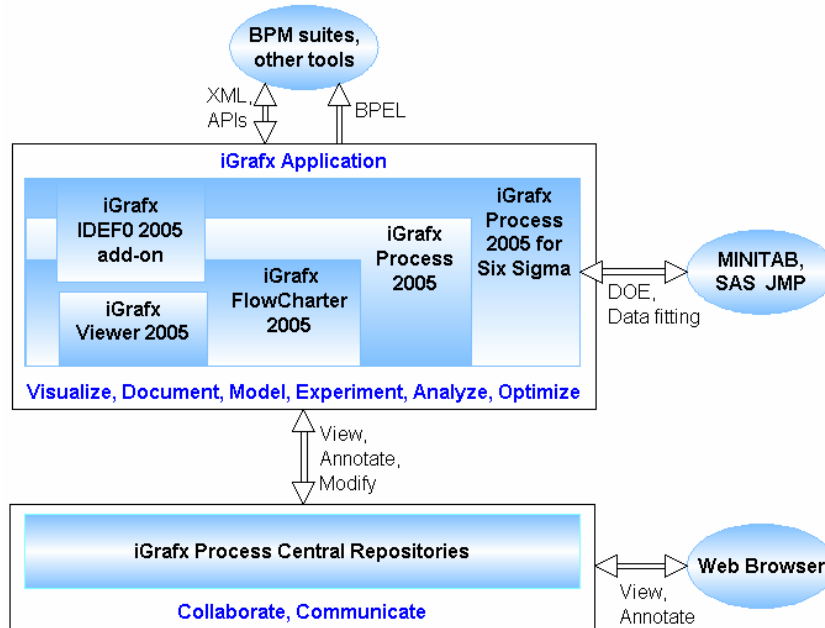


Figure 3. iGrafx General Architecture

Figure 3 shows a process flow model created in iGrafx. When swimlane diagrams are printed on multiple pages, department headers automatically repeat on each printed page and off-page line connectors appear, as necessary, at page boundaries.

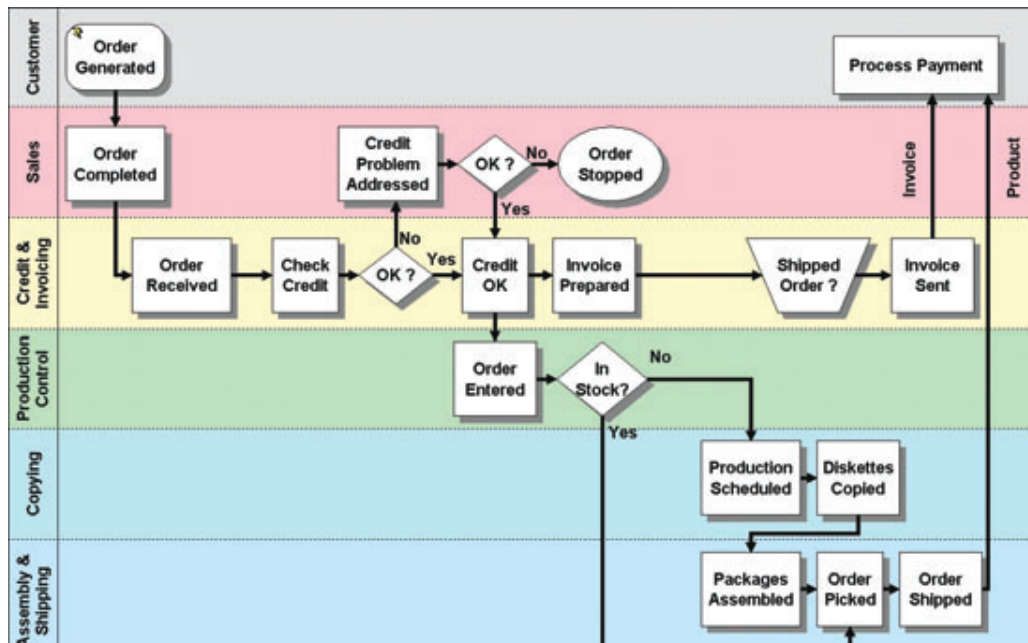


Figure 4. iGrafx Process Flow Model.

**2.3. Repository Options/Support for Team Development**

iGrafx Process Central repository provides a team-based, collaborative repository that supports enterprise process initiatives. Used with iGrafx client applications (e.g., FlowCharter), Process Central provides the following functionality:



- Process Central Explorer – iGrafx application users use this repository window to execute all Process Central user commands from within the iGrafx application.
- Versioning – allows users to store multiple versions of a document; enables users to make changes to a document without losing prior versions of the document.
- Link management – manages various links between repository objects; when an object is renamed or moved within the repository, all links to the object update automatically.
- Department data dictionary – ensures consistent use of department names across a repository of process maps. If a department name changes, the change is made to all process maps that use that department name.
- Audit trails – provides audit and history information for users to track document changes.
- Query and search – Users can create database queries to extract information and data from repositories.
- Security – Administrators can control what users are allowed to do with repository documents based on what role they are assigned. Each role includes a set of permissions.
- Approval and voting – allows administrators to control how and by whom documents are approved, with consensus on changes gathered from specific individuals or groups.
- Annotations – lets users add comments to documents without changing them.
- Web viewing – Browsers have real-time access to process documentation as process knowledge is added to repositories. When necessary, access is limited to approved documents.

The iGrafx Process Central repository runs on Microsoft SQL Server and Oracle 8i (or later) databases. The database installs on a server operating system. No iGrafx software is required on the server on which the database runs.

Figure 4 offers a more detailed look at the functionality provided by the iGrafx Process Central components and their interaction with the iGrafx applications.

**iGrafx Viewer.** The iGrafx Viewer is a read-only version of iGrafx FlowCharter. Viewer users can view, annotate, and approve repository documents, but the iGrafx Viewer cannot add documents or check-in modified documents to repositories.

**Server Administrator.** The Server Administrator creates, manages, and maintains Process Central repositories stored in SQL Server or Oracle databases. The Server Administrator is an application and not a service.

**Web Central.** Web Central is an Internet Information Service (IIS) plug-in that provides browser-based viewing of Process Central repositories. Web Central uses only Java applets, meaning that clients can view and annotate documents from any operating system on any type of machine supporting a Web browser and Java support. The browser requires no iGrafx software.

**Mail Central.** Mail Central generates and delivers email notifications when documents have been nominated for approval.

The Server Administrator, Mail Central, and Web Central components install on any Windows-based computer with access to the repository databases.

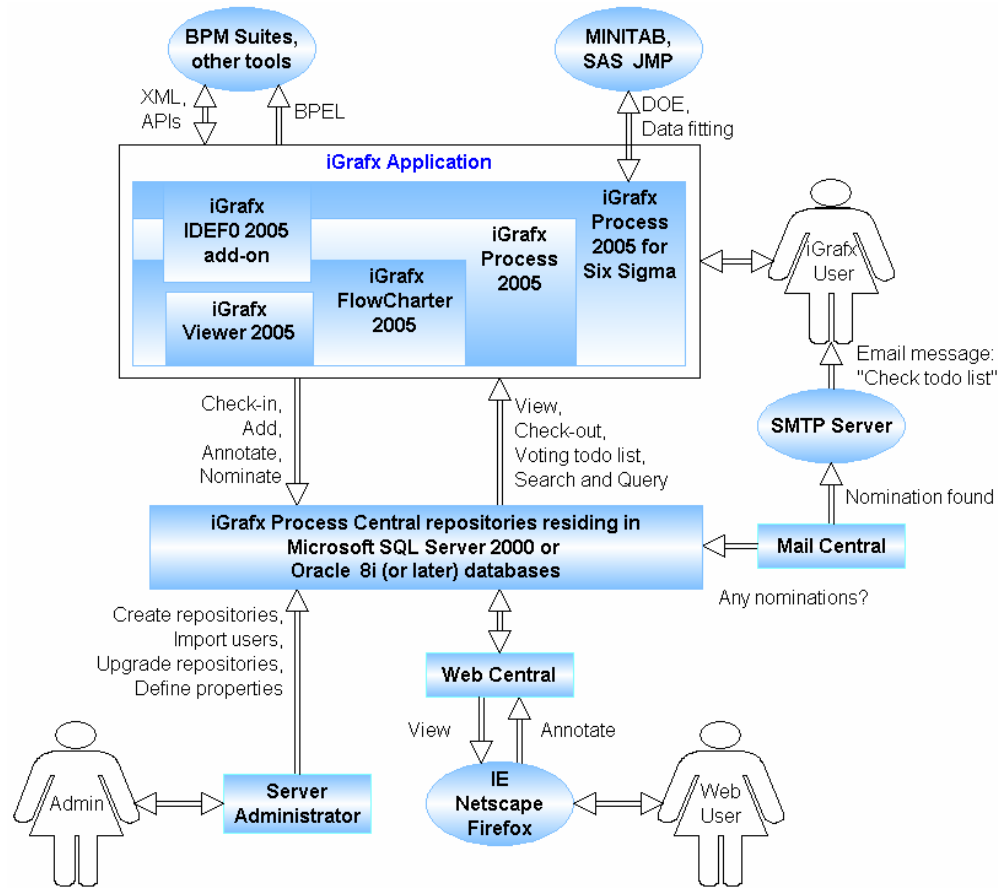


Figure 5. iGrafx Process Central Architecture

**2.4. Integration with Other Products**

The iGrafx Suite features APIs and import/export formats for integration/interoperability with other products. The API, for example, integrates iGrafx Process for Six Sigma with the MINITAB and SAS JMP statistical analysis packages. Integration features include:

- Microsoft Visual Basic for Applications (VBA)
- XML import/export
- BPEL export (available as an optional interface product)
- COM API

The iGrafx API is composed of over 4,000 VBA methods, events, and objects for customizing the product or integrating it with third-party process tools. Several iGrafx partners and customers have created product extensions using the API; numerous partners including Metastorm, CommerceQuest and Plexus have integrated iGrafx into their BPM suites.

BPEL generation capabilities make iGrafx attractive to organizations wanting to deploy iGrafx-designed business processes to other BPM suites and execution environments.

In addition to the above interfaces, iGrafx includes two import interfaces to external data. Modeling data describing process activities is read from any ODBC compliant database (e.g., Excel) to define metrics data (e.g., activity duration time) for all shapes in a process map. During process simulations, transaction attributes (e.g. order type, order size, call origination, etc.) can also be read from external data as the simulation executes.



Finally, iGrafx can support XMI and XPDL via custom solutions based on an XML API and XSLT translator.

### **3. Analysis and Process Modeling**

#### **3.1. Enterprise and Organization Models**

##### **Enterprise Architecture Models**

iGrafx applications support all enterprise architecture components that relate to business processes. This includes process maps, dataflow diagrams, organization charts, network diagrams, cause and effect diagrams, etc. Although an enterprise architecture framework does not ship with iGrafx applications, customers use the flexible user interface to define their own framework, or iGrafx will build a framework to customer specifications.

##### **Organization Models**

The OrgChart diagram type defines organizational structures. This is an intelligent diagramming tool that automatically lays out the organization structure and includes options for hierarchical organization charts and multiple org chart styles.

As the business model decomposes down to individual processes, the Process diagram type displays organizational units as swimlanes. iGrafx process maps clearly show the definition of tasks by organizational unit. All organizational diagrams can be linked together.

##### **Resource and Cost Modeling**

A range of resource categories and cost definitions (including overtime, value added, and non-value added), schedules, and usage patterns (calendars) are modeled by iGrafx applications. Worker pools are available by default for each process map swimlane drawn. Hierarchies of worker pools are possible, and non-worker resources are allowed.

##### **Mapping Organizational Strategies to Performance Measures**

Project leaders define and apply strategies and goals as Process Central object properties. Process owners then define how each process map or business structure meets the particular goal or strategy.

##### **Managing Process Portfolios**

iGrafx Process Central manages model and process related documentation.

#### **3.2. Defining Processes**

##### **Defining Processes**

Users define processes graphically in iGrafx by creating process diagrams in the format of their choice, including BPMN, Swimlane, Value Stream Map, and IDEF0. Metrics (e.g., activity duration time) are added to graphical processes by double-clicking shapes and filling a Properties dialog box. To enable process analysis and simulation, one or more scenarios describe the process run-time environment – for example, resource definitions and the length of real-life time to simulate.

##### **Process Information Storage and Integrity**

When running stand-alone, iGrafx applications store process information in document files. Each file contains any number of diagrams, scenarios, and reports. When using iGrafx applications with Process Central, processes can be shared by multiple documents. By sharing, rather than duplicating processes within a repository, process integrity is better maintained. Additional Process Central features, such as the department data dictionary, also ensure process integrity by enforcing consistent use of department names throughout a repository.

##### **Graphical Notations**

iGrafx applications support numerous diagram types and notations, including process maps, BPMN, swimlane, cause and effect, UML, standard flowcharts, value stream maps, network diagrams, data flow,

organization charts, pick charts, IDEF0, SIPOC diagrams, and SPC charts. Users can also define their own notations by customizing document templates, shape palettes, and the Toolbox Toolbar (a quick-access palette on the left frame of the product).

Users create BPMN diagrams – available as a standard component of all iGrafx applications – using an intuitive interface that automatically manages many of the drawing tasks. The correct-by-construction features reduce model development time and validate compliance with the BPMN standard. For example, iGrafx draws the BPMN Event object differently (thin, thick, or double-line border), depending on object placement in the process flow.

iGrafx applications automatically generate BPMN diagrams from an organization's existing swimlane diagrams. This feature enables companies to leverage process intelligence already available in their organization. Users can also simulate BPMN diagrams prior to deployment. Finally, BPEL exports from BPMN and swimlane diagrams using the optional BPEL interface. (For more on BPEL generation, see Section 7.2).

iGrafx applications support UML 2.0 activity diagrams.

### **3.3. Subprocesses and Activities**

#### **Handling Subprocesses and Activities**

iGrafx applications provide a full capability for creating and linking to subprocesses. Users navigate hierarchical processes with the Back and Forward buttons. iGrafx Process and iGrafx Process for Six Sigma simulate hierarchical processes.

Rummler-Brache style *Relationship* diagrams are drawn with the Basic diagram type. Flexible line routing and easy formatting options make it simple to draw organization relationships.

#### **Defining Activities**

Users define activities in iGrafx by choosing and dropping shapes onto a diagram and then setting the shape properties appropriate for the activity represented.

#### **Documenting Decision Rules**

The Inputs and Outputs pages of the shape Properties dialog box define decision rules. For example, an Input decision *Gate* rule could define that customer billing waits until their corresponding order ships. An Output decision rule could define that all orders over \$10,000 require manager approval while other orders follow regular routing.

#### **Rules Entry**

Rules are entered on the Inputs and Outputs pages of the Properties dialog box.

#### **Activity Costs, Resources, and Time Data**

Cost, resource, and time data are associated with diagram shapes representing activities. Scenarios model resource costs (both standard and overtime).

### **3.4. Simulation**

#### **Simulation Capabilities**

iGrafx Process and iGrafx Process for Six Sigma both feature a Discrete Event simulator engine, which includes features for Monte-Carlo analysis. Models created by all iGrafx applications, including FlowCharter, are ready for simulation.

Dynamic simulations analyze any service or manufacturing process structured concurrently or by hierarchy. One or more simulation scenarios tracking cycle time, resource constraints, costs, bottlenecks, and more are reported. A key feature is the ability to model process behavior by assigning and using attribute values (e.g., order origination) for transactions simulated. Attributes work in tandem with



process rules to better imitate the real-life process. An animated trace mode is available for an interactive simulation view.

### **Analytic Capabilities**

Analytic capabilities include the simulation trace mode, intelligent shapes, activity fields, multi-result reports, and advanced features such as iGrafx Process for Six Sigma RapiDOE (Design of Experiment). Dropped onto process diagrams, intelligent shapes graphically monitor run-time simulation data (e.g., queue size, transactions processed, etc.). Simulation highlights are presented optionally by activity fields on the process map. Simulation results of multiple experiments display side-by-side in reports for easier analysis. RapiDOE analyzes multiple factors and responses with a single command.

### **Real-time Data Utilization**

During process simulations, transaction attributes (e.g., order type, order size, call type, etc.) can be read from external data as the simulation executes. This is set up in the Generators dialog box for a simulation scenario. Using the API, additional real-time data feeds are available through iGrafx BPM partner solutions provided by Plexus and CommerceQuest.

### **Model Distribution and Simulation on Enterprise Networks**

Models simulate as individual documents (.igx files) or are checked out of the Process Central repository and simulated. When using iGrafx Process Central, the simulated model may include processes defined across an enterprise network by authors who store their models in a Process Central repository.

### **Statistical Fit/Data Analysis**

The Fit Data feature of iGrafx Process for Six Sigma analyzes tables stored in statistical analysis tools (MINITAB or SAS JMP) and fits the data to common distribution curves. From the iGrafx application, users select the best fitting curve and apply it to any iGrafx expression field (e.g., activity duration time).

### **Capture and Reporting of Simulated Metrics**

Simulation results are summarized in a tabular report organized by Time, Cost, Resources, Queue, and Custom tabs. Each tab contains multiple tables with row and column definitions defined by users to fit individual needs. Reports can combine tabular and graphical summaries, and custom statistics are available. In addition, the Log Transactions command reports the results of every transaction processed by the simulation. All report results optionally export to other tools for additional analysis.

## **4. Business Process Methodologies**

### **4.1. Business Process Methodologies**

iGrafx bills its tools as “methodology independent” products; however, they do include support for popular commercial methods such as Rummler-Brache, Six Sigma, Value Stream, and IDEF0.

The company points out that it has over ten years of experience with the swimlane format used by the Rummler-Brache methodology. The BPMN and IDEF0 methods are supported with specific diagram modelers that include rules checking, and correct-by-construction features.

As noted previously, iGrafx provides process initiative support for Six Sigma, Lean Six Sigma, Lean Manufacturing, ISO, Sarbanes-Oxley, and IDEF0.

### **4.2. Six Sigma Support**

iGrafx Process for Six Sigma is ideally suited for Six Sigma analysis, providing integration with MINITAB and JMP, as well as providing static and simulation transaction analysis suited to the Six Sigma user. In fact, a number of consultancies have standardized on iGrafx to support their Six Sigma consultants and training courses, including the American Society for Quality (ASQ), Six Sigma Qualtec, Sigma Breakthrough Technology Group, and Breakthrough Management Group.

## 5. Report Generation and Document Management

Reports generate from a model or repository perspective. With a model open, the tabular view displays all diagram elements and their underlying data in a clean, customizable, row and column format. Model properties are editable in this view, and model data exports in text delimited or XML files. In addition, model simulation reports include Time, Cost, Resource, and Queue pages that are also customizable. Simulation reports save with the document and publish to Word, PowerPoint, and Web formats.

Reports spanning multiple repository documents (e.g., list all processes containing the *check credit* activity) are created by running process queries or searches and then exporting the results displayed in the Process Central explorer window (right-click and choose Print Results or Copy Results).

iGrafx Process Central provides document management capabilities for both iGrafx and non-iGrafx files (e.g., Microsoft Office documents). Interfaces to third-party document management systems are available via custom integration.

## 6. Development Environment

### 6.1. Language of Tool

The iGrafx applications and Process Central repository are developed in Windows with a COM-based API as follows:

Client: C++, MFC, COM

Web Central: Java, Browser independent

### 6.2. Product Support, Maintenance, and New Versions

Maintenance (i.e., incremental updates) is available periodically via Web software service packs. New product versions ship on CD or can be downloaded via the iGrafx Web site.

iGrafx provides free standard technical support via the web. Premium support is available for customers on maintenance or who have purchased support incidents via phone and personalized support portal.

## 7. Software Modeling and Code Generation

iGrafx does not market specific interfaces for integrating with select software design and development environments like IBM Rational Rose or MS Visual Studio; however, integration with such products is possible via the iGrafx API, which enables users to directly access modeling data, results, user interfaces, and so on. Integration is also possible via XML and BPEL.

### 7.1. UML Model Generation

Users can create the following UML diagrams with iGrafx applications: Activity, Class, Collaboration, Component, Deployment, Package, Sequence, State, and Use Case.

### 7.2. BPEL Generation

The BPEL export capability is purchased separately and works with Process and BPMN diagram types.

It is worth pointing out that iGrafx's BPMN modeling and BPEL generation capabilities help back up the company's claim that its tools can help "bridge the gap" between business analysts and IT. BPEL uses a structured notation for defining a process and its interactions. Although necessary for IT professionals to implement a process, this structure is too complex to be used practically by business analysts designing processes. Using iGrafx applications, business analysts can define process maps using

BPMN or swimlane diagrams. This model can then be handed off to IT professionals, who add execution data and other detail necessary for refining the model to incorporate interactions with messages and partners, etc. The process map is then mapped, together with the required external Web Service Definition Language (WSDL) definitions, to create compliant BPEL ready for deployment.

## 8. Templates and Frameworks

iGrafx provides templates for such methodologies as BPMN, value stream maps, Rummler-Brache, and IDEF0 diagrams. Additionally, third-party vendors offer additional templates for such areas as ISO compliance and network diagramming.

Regarding the inclusion of domain-specific knowledge in the form of specific processes or rules packaged with the product, the iGrafx BPMN and IDEF0 diagram types include extensive rules checking and correct-by-construction capabilities. Of particular interest is iGrafx's partnership with Siebel Systems, which provides Siebel users with access to more than 800 process maps that define the Siebel application – invaluable for companies deploying or upgrading Siebel components.

## 9. Systems Administration and Security

iGrafx supports team development with the use of the optional iGrafx Process Central repository. Process maps, models, and supporting documentation are stored in this central repository, which can be searched and queried. In addition, it also enables processes to be shared and reused by multiple documents. Process map links to supporting documents (e.g., a Word document, etc.) are maintained even if the supporting document is moved or renamed. Other administration and security features include the Department Data Dictionary, which maintains a centrally controlled list of department names used by process maps.

iGrafx applications use Microsoft Windows Installer (MSI) technology which enables software deployment and management from administration points. “Thin” application installs are an option.

Security features are available when using iGrafx applications with Process Central. Users and groups gain access to repositories using Microsoft SQL Server Enterprise Manager or Oracle administration tools. User and group name information imports from LDAP sources via the Process Central Server Administrator tool where display names and e-mail addresses (used for approval email notifications) are changed if necessary.

Within a repository, administrators, project leaders, and iGrafx application users (depending on their defined rights) define roles, rights, and permissions for folders and documents.

iGrafx provides various features and functionality for administrators to manage the work environment, including:

- Define user access roles and permissions
- Require comments when adding documents to repositories
- Require comments when checking in new versions
- Require comments when voting to approve new versions
- Require digital signatures when voting to approve new versions.

## 10. Scalability

**Vertical scalability:** iGrafx applications are highly scalable. From the desktop authoring perspective, users have the option of installing one of three authoring applications and the optional IDEF0 add-on.

The authoring tool choice is driven by the needs of the users (for example, Six Sigma Black Belts use Process for Six Sigma, while FlowCharter is used by Green Belts). Process models created in one application can be edited in the others and all applications have the same look and feel. The free iGrafx Viewer offers read-only access to iGrafx documents and can perform document approvals when used with Process Central.

**Horizontal scalability:** iGrafx Process Central enables the managed sharing of work across organizations. Through check-in/check-out control and versioning, work teams distribute workload to appropriate individuals and consolidate their results centrally.

Organizations deploying Process Central achieve central management and control of process documentation, which provides for knowledge sharing across functional and geographic boundaries.

iGrafx models describe and analyze any size organization. For example, iGrafx Process and Process for Six Sigma simulate both hierarchical and parallel processes within a single file and within scenarios (e.g., department resources, etc.) that span multiple processes.

When using iGrafx applications with Process Central, processes can be shared by multiple documents. This enables simulation across file boundaries and between interrelated models with dozens of processes and thousands of activities.

## 11. Platforms

iGrafx applications run on Windows XP, Windows 2000, Windows Me, Windows NT 4, and Windows 98.

The iGrafx Process Central repository requires Microsoft SQL Server 2000 (optionally sold with Process Central) or Oracle 8i (or later) database. These databases run on Windows Server and other server operating systems.

## 12. Pricing

iGrafx offers volume-based discounts for products and support. Pricing is based on per-user licensing for desktop applications, with a suggested retail price range from \$395-\$1,895. Server products are priced per server with no additional per-user fees, with pricing varying according to the needs of the organization. Support options are available based on a per-incident rate or as part of a maintenance contract.

## 13. Company, Product Positioning, and Support

### 13.1. Company Background Information

iGrafx was founded in 1987 and operates as an independent business unit of Corel, Inc. The company is based in Tualatin, Oregon, USA, and has approximately 40 employees. It also has representatives in Germany, UK, Spain, France, Italy, Austria, Denmark, Poland, Japan, Korea, Canada, and Mexico.

### 13.2. Positioning

iGrafx has positioned iGrafx products to support a variety of business performance change initiatives, such as business performance analysis and modeling, Six Sigma, Lean Six Sigma, Lean Manufacturing, ISO, Basel II, and IDEF0 efforts.

In short, the iGrafx applications offer extensive capabilities and features that make it suitable for a wide-range of EA modeling and BP change activities, including:

Enterprise architecture modeling and analysis

- Process modeling and analysis, redesign, and improvement
- Detailed process modeling and analysis
- IT support/software development
- Human performance improvement initiatives
- Development of management and measurement systems

Extensive support for a wide variety of diagramming types and methods makes iGrafx applications well suited for process mapping, modeling, and documenting organizational structures. When combined with the repository option, iGrafx provides capabilities for communicating how tasks, activities, and processes are carried out, and for capturing, sharing, and managing critical process knowledge across the organization. Moreover, it does so in a manner that helps bridge the gaps that exist between the different process constituencies consisting of general business users, analysts, and IT.

Strong Six Sigma support and organizational mapping capabilities make iGrafx well suited for supporting the development of management and measurement systems as well as human performance management initiatives. In particular, iGrafx offers exceptional features and functionality for Six Sigma – as confirmed by the various organizations that are using iGrafx for their Six Sigma efforts (both internally and for consulting). In addition, iGrafx's simulation capabilities support detailed process modeling and analysis. Finally, its smart BPMN diagramming and BPEL generation capabilities make iGrafx products attractive to IT organizations wanting to design, diagram, and deploy business processes to BPM Suites and other execution environments.

### **13.3. Product Training**

iGrafx offers both public and private (on customer site) product training classes to help organizations use the company's software. Training classes focus on simple flowcharting concepts initially, moving progressively towards analysis and modeling, and finally concluding with advanced simulation exercises. With public training, each user trains at an iGrafx facility, at workstations (provided) in a hands-on, instructor-led environment.

Private training features iGrafx training professionals working at the customer facility. iGrafx instructors provide the training materials, while the customer provides training space, individual workstations for participants, and software installation.

### **13.4. Business Process Consulting**

iGrafx has a dedicated consulting team. In addition to offering turnkey services, iGrafx offers professional services tailored to an organization's specific needs, including:

- Custom modeling assistance to help organizations successfully apply iGrafx Process and iGrafx Process for Six Sigma for modeling, analyzing, and simulating business processes.
- Rapid Process Modeling designed to accelerate an organization's Six Sigma initiative by applying iGrafx tools and methodologies.
- Custom solutions tailored to meet an organization's specific business process needs.

## **14. Case Study**

Recognizing the need to reduce the length of product change cycle times and customer return process, Systemax used iGrafx Process for Six Sigma to increase customer satisfaction, reduce cycle times, and reduce error rates.

**Background.** Systemax is a Fortune 1000 company that designs and builds PCs. Systemax PCs are assembled in a state-of-the-art, ISO 9001 certified production facility. ISO 9001 certification means the Systemax process was carefully documented to ensure all computers are carefully engineered and consistently assembled. Each PC goes through 14 rigorous quality control checkpoints, covering more

than 180 items, to ensure it complies with the international quality standards for design, engineering, and manufacturing. Every input, output, memory module, hard drive, disk, and processor component is checked during multiple test cycles.

Bob Rose, Vice President and General Manager of Systemax Manufacturing and a veteran of both TQM and Lean Manufacturing methodologies, first recognized the potential benefits of Six Sigma for his company. Rose developed a proposal for a Systemax Six Sigma initiative and presented it to the board of directors for approval. As a result, Systemax engaged the American Society for Quality (ASQ) to train its first wave of Six Sigma Black Belts.

Jeremy Ross, a software developer and Web designer at Systemax, was one of the first in the company to learn this new methodology. iGrafx Process for Six Sigma was prominent among the tools and disciplines he quickly mastered.

**The Challenge.** Systemax executives identified two opportunities for immediate improvement. Their first goal was to reduce the length of product change cycle times between the company's East Coast offices and its Fletcher, Ohio USA computer manufacturing facility.

The company also wanted to further investigate its *No Problem Found* rate. This is a critical function for direct computer manufacturers since it represents returned products that are not defective in any way. When customers return products that do not work, a direct computer manufacturer loses money. If the returned products are not actually faulty, the losses are substantially worse.

Armed with his new Six Sigma Black Belt certification, and the support of Systemax executives and its board of directors, Ross immediately started working on both projects with iGrafx for Six Sigma. "Right from the beginning, I used iGrafx for Six Sigma on all my projects," Ross explained. "I've used competing products, and the iGrafx tool is a lot easier to use. It's more flexible and quite a bit faster. You can get process maps drawn out quicker, and it has support for a lot more advanced process simulation features. On top of the process mapping ability, you can also use your process model to conduct experiments and conduct *What-If* analyses."

**The Solution.** The first step was to create an accurate process model to document product change cycle times between Systemax's East Coast offices and their manufacturing facility. "I did a very detailed iGrafx simulation that was absolutely the key enabler in identifying where the opportunities were," Says Ross. "Without simulating the process, we never would have found all the ways to reduce cycle time and eliminate steps that were delaying the process."

To ensure the accuracy of the process model, he worked closely with everyone in the company from IS directors to manufacturing project managers. "There were so many contingencies – just tons of Boolean logic, where we had to make sure we got all the switches, splits, and joins. And we had to make sure the timing was accurate at each step. But once I was done, I could show you a picture of the process that no one could have come close to showing before. The simulations we did were absolutely fascinating."

Helping managers visualize how the process actually worked was just the first step in the improvement process. "The model gave me insights I never would have discovered any other way," Ross says. "It's amazing to be able to teach people about what was right under their noses that they didn't realize."

While department managers began implementing his recommendations to improve product change cycle times, Ross moved on to apply Six Sigma methods to determine the extent of, and possible solutions for, the *No Problem Found* rate issue. Heading up an interdisciplinary team that included test engineers, customer service representatives, and top-level Systemax executives, Ross immediately got to the core of the problem.

"We used the Six Sigma methodology to analyze all the data that was related, trying to bring forward significant factors," says Ross. "Our first step was to validate our key metrics. Having an accurate *No*



*Problem Found* rate was essential to knowing whether or not we were going to succeed, and, also, to validating whether we had as large a problem as we thought.”

The team performed a battery of Gauge Repeatability and Reproducibility (R&R) tests on the testing process, to determine if measurement of the *No Problem Found* rate was effective. Based on the input, they made immediate improvements in testing, training, and measurement to ensure that returned products were being properly evaluated. With that baseline metric in place, Ross continued the analysis process, working with iGrafx for Six Sigma process diagrams and a handful of statistical tools. He made extensive use of the application’s integration with MINITAB for conducting Design of Experiments (DOE).

“We would define the factors and responses in iGrafx for a DOE, let MINITAB create the experiment set, and then run the experiments in iGrafx Process for Six Sigma. At that point, we would quickly turn around and export the data back into MINITAB for more detailed analysis. DOE, Multi-Vari Charts, and binary logistic regressions ended up being our most important tools,” Ross explained. “Without the iGrafx simulation capability and link to MINITAB, I would never have been able to determine which factors were really statistically significant in affecting the *No Problem Found* rates. If you don’t do analyses, you may see factors that have an effect, but the data can be misleading unless you really do the math.”

**The Benefits.** After two weeks of refining and verifying their process model, the team began working with everyone involved to make the improvements. What did they achieve by “doing the math”?

“There was a real wealth of information buried in the data that we were able to use. We recommended changes that cut across almost every department. Different groups worked to refine our standardized parts list, improve our knowledge base about warranty parts, put additional internal controls in place, and add new training programs for technicians and customer service reps.”

The result? A decrease in the *No Problem Found* rate of over 67%, with a projected annual savings of \$1.58 million.

Using iGrafx Process for Six Sigma, Systemax gained new insights into its business processes by reducing cycle time and error rate, and performing *What-If* scenarios in a risk-free environment. After an initial investment to learn the tools and the methodology, Systemax quickly achieved its corporate goals and executed its Six Sigma project faster and with more certainty.

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## MEGA Suite

Version: 6.1

### MEGA

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#### 1. Product Overview

MEGA Suite is a repository-based modeling environment designed for process modeling and enterprise architecture initiatives. As summarized in Table 1, MEGA Suite consists of three main products – MEGA Process, MEGA Architecture, and MEGA Designer – each of which are designed to support different users' needs and project requirements.

MEGA Process is a business process modeling and analysis tool for defining, understanding, and documenting processes, organizational structures, procedures, and tasks. MEGA Architecture is used to describe how IT operations support the associated business functions. MEGA Designer complements the MEGA Process and MEGA Architecture tools with a UML-based modeling environment that supports service oriented architecture, database architecture, and object component-based design.

These three main products can be used individually or combined. When used together in conjunction with other MEGA modules, these tools combine to provide a single open platform that supports business process modeling, enterprise architecture, IT architecture and component analysis, and systems design efforts.

MEGA is suitable for top-down or bottom-up enterprise architecture projects. It provides modeling languages adapted to each EA audience and links them to one another for traceability and impact analysis via the MEGA repository.

Other features include simulation and animation capabilities and automated documentation generation, including the ability to generate fully functional websites and dashboards for disseminating models and simulations across an organization. Various language generation capabilities are also available, along with security and maintenance modules. MEGA also features facilities for creating standard models and templates, and offers several pre-built models and templates for use with the tool set.

MEGA supports various enterprise architecture frameworks and business process methodologies; these include pre-built templates companies can use to quickly create project websites for assisting with Zachman, Six Sigma, Balanced Scorecard, and other initiatives.

Finally, MEGA Suite is based on the Object Management Group's (OMG) Meta Object Facility (MOF). Thus, end-user organizations can extend its functionality to support just about any kind of modeling, methodology, design, documentation, and language generation requirements.

**Table 1—Overview of MEGA Suite**

MEGA Process	Designed for business analysts. Business process modeling and analysis tool for defining and documenting processes, organizational structures, procedures and tasks, and for understanding their interdependencies. Automates documentation and HTML website generation for sharing models and associated information with project teams.
MEGA Architecture	Designed for IT architects. Enterprise architecture modeling tool used to describe how IT operations support the associated business processes and functions. Together, MEGA Process and MEGA Architecture deliver to the MEGA Repository a comprehensive view and record of how business and IT work together. Automates documentation and HTML website generation for sharing models and associated information with project teams.
MEGA Designer	Designed for project managers and software architects. Complements the MEGA PROCESS and MEGA ARCHITECTURE business modeling tools with a UML-based modeling environment comprised of three main modules: Systems Integration, Object component-based development, and Database development: Integration module features workflow-based tools that support EAI, service-oriented architectures, and business process automation design efforts. Can also specify and document Uis. Database module is used to create reference data models at the logical and conceptual level, and for developing XML or relational databases. Development module provides traditional OOA&D capabilities for component-based development. Links with MEGA Generator (see below) to provide code generation capabilities including: BPEL for process engines; SQL for RDBMS; XML Schema; and Object code and XMI. Code generation capabilities are customizable. Also provides reverse engineering capabilities (Java, VBX, XML). A Rational Rose bridge is also included for linking to IBM's popular ROSE environment.
MEGA Repository	Provides check-in/check-out facilities and private workspaces and impact analysis to support multi-team development, but does not provide online versioning capabilities. These are provided by the use of configuration management tools; MEGA has a partnership with Continuous Software for this purpose. MEGA Repository is based on the OMG's MOF, and is therefore completely extendable. Features a number of pre-built meta-models, including ones for ISO 9000, UML]. MEGA Explorer provides repository browsing capabilities.
MEGA Simulation	Adds Discrete Event simulation and animation capabilities to process models built with MEGA Process and stored within MEGA Repository. Features tools for evaluating different simulation scenarios and for linking simulation results with project objectives. Can also deliver web-based simulation dashboards.
Administration Modules	MEGA Documentation. Provides document generation capabilities in multiple formats including MS Word, HTML, and RTF.  MEGA Generation. Adds language generation capabilities to MEGA Designer including, Java, VBX, Delphi, XML (including XML schemas), and SQL.  MEGA Intranet. Automatically generates web pages that include hyperlinks and drill-down capabilities.  MEGA API. COM-based API with full read-write capabilities and Visual Basic for Applications (VBA) integration.  MEGA Supervisor. Provides maintenance of security and tool/repository authorization facilities.



MEGA Exchange	Provides text-based import/export facility (for any repository object); XMI import/export facility for UML models; Rational Rose import/export facility for all UML models, including diagrams.
Pre-built Models & Templates	Basel II Risk Type Library for financial institutions, ISO 9000 Chapters.

## 2. Product Architecture

### 2.1. Architecture Overview

Figure 1 gives an overview of the MEGA product architecture, which consists of three main components: Repository, Modeling Desktop, and Publisher.

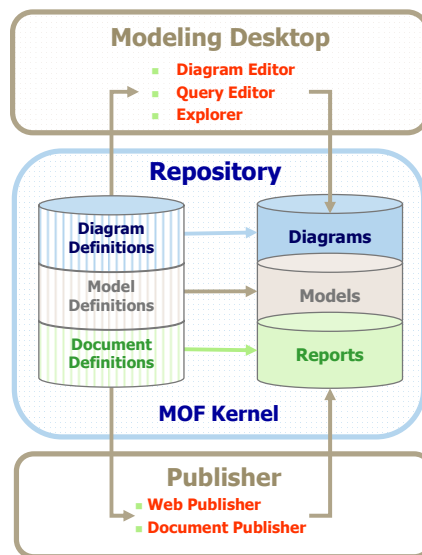


Figure 1. Overview of the MEGA product architecture.

The three main products – MEGA Process, MEGA Architecture and MEGA Designer – deliver meta-models, diagram types, and templates for each specific business process analysis or enterprise architecture audience. When combined, these tools form a single integrated Modeling Desktop combining all models. Thus, although available as separate products, when integrated, they can natively create connections between the different models for traceability and impact analysis because they all utilize the same Modeling Desktop and Repository.

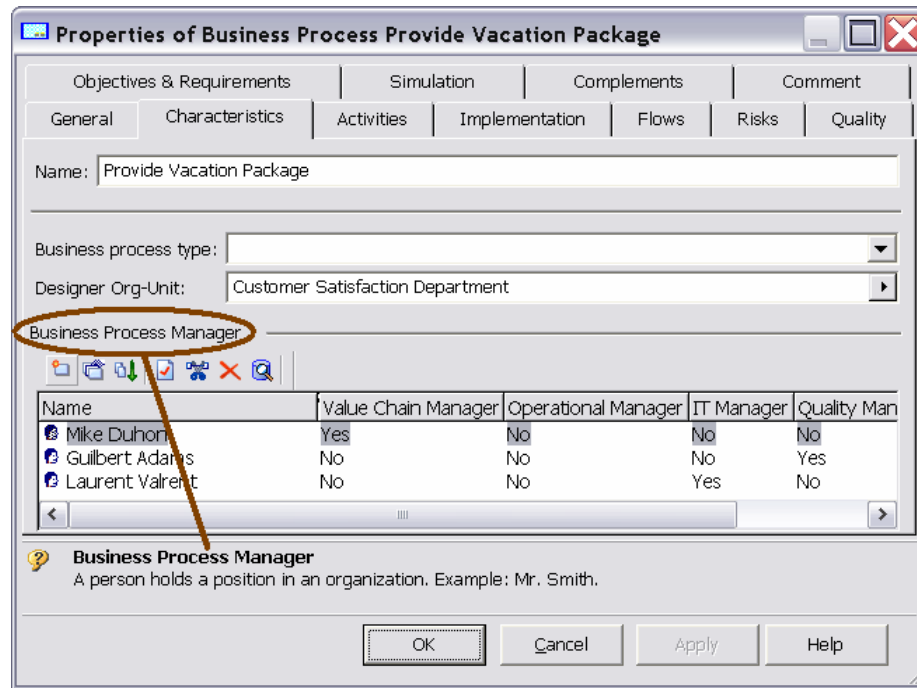
MEGA products can be deployed in three different architectures:

- Stand-alone workstation:** Programs and repository are installed on a workstation. This does not allow users to exchange data with other users.
- Client-server:** Programs and repository are installed on a file server. Programs are either copied locally on workstations, or workstations are configured to run MEGA from the network.
- Thin client-server:** Programs are installed on an application server, and the repository is installed on a file server. This architecture is recommended for work groups distributed across different sites.

**2.2. Usability and User Interface**

MEGA modeling tools support both general business users and technical analysts. MEGA Process is intended more for general business users, while MEGA Architecture and MEGA Designer are more for technical users like IT architects, project managers, and systems designers. However, all models are connectable because they share the same repository and the same Modeling Desktop.

MEGA tools are Microsoft centric. They all utilize the same MEGA Modeling Desktop – a standard Windows-based application adhering to the MS Office paradigm. As shown in Figure 2, all menu items are organized as standard Windows menus, with action items, copy/paste, and properties. Property sheets are organized with standard tabs. All object property sheets have standard “General,” “Characteristics,” and “Comment” tabs. In addition, each property sheet includes embedded help on objects, attributes, and link definitions. Help text is derived from meta-data definitions available in the MEGA Repository.



**Figure 2. MEGA Desktop Interface.**

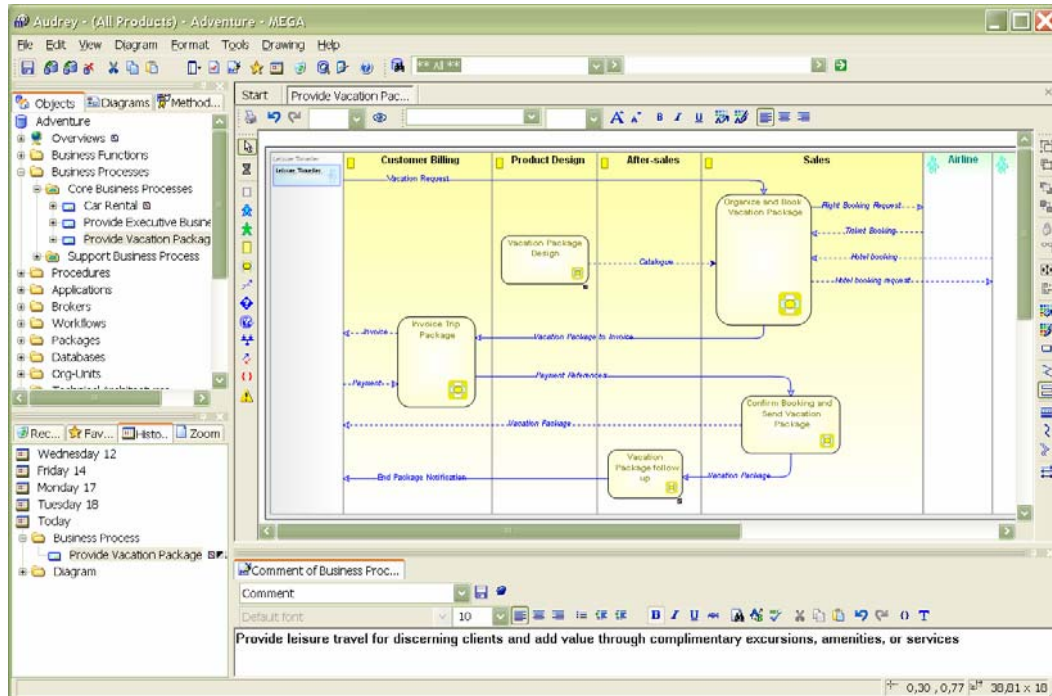
MEGA’s diagramming interface (Figure 3) provides a graphical modeling environment utilizing the popular Swim Lane format. It, too, adheres to all the features available in standard MS Office products for inserting objects, moving shapes, drawing links, and so on. The tool also features a Diagram Editor that provides advanced graphics capabilities for diagram creation. This includes a rich shape library end-users can extend with a shape editor to create their own modeling and diagramming conventions.

The MEGA Modeling Desktop also offers advanced object navigation, wherever objects are made accessible to users. Users can take advantage of a various views of their objects and models, including

- A Navigator that offers a structured organization of objects, projects, diagrams, keywords, and methodologies
- An Explorer (available via any object menu) that provides advanced navigation among object links
- A Diagram Viewer for fast preview and navigation among diagrams
- A Query Editor whose engine can handle simple to complex queries for retrieving any object available in the repository (This includes ready-to-use queries that can be made available to users to speed up their productivity)

A Matrix Editor that enables easy cross analysis of objects  
 Keyword taxonomies that can be created for classifying model elements according to user criteria

The Publisher provides MEGA tools with various documentation capabilities, including automated document generation in MS Word, and the ability to generate websites and dashboards for communicating business process, enterprise architecture, and simulation models to distributed viewers.



**Figure 3. Business Process Model in MEGA Modeling Interface.**

**2.3. Repository Options/Team Development**

MEGA repository is based on the MOF kernel (according to OMG specifications for meta-data and repository). It can support an unlimited number of users, and provides check-in/check-out facilities and private workspaces and impact analysis for multi-team development. This is accomplished via use of supplemental configuration management tools.

Access to MEGA Repository is user-based and controlled by name and password (a unified login is also available via single sign on), with access to sensitive features controlled according to user profiles. Modeling objects are protected by access rights, which are organized as a hierarchy. Administrative tools are provided for administrators to apply access rights at any object granularity. (For more on administration, security, and concurrent access management, see Section 9.1.)

All objects stored in MEGA Repository have a comment property. An available comment editor supports rich text format and includes a spell checker. Repository browsing capabilities are provided by MEGA Explorer (as discussed in previous section).

Because it is based on the OMG’s MOF, MEGA Repository is completely extendable and offers considerable customization capabilities, including

- Meta-model customization: Includes the ability to create new attributes and concepts and define new associations between concepts
- Diagram type customization: Includes the ability to create new diagram type extensions and new diagram types





- UI customization: Includes the ability to create custom object shapes and icons and customer object menus and tabs
- Navigation Tree customization: Offers customized entry points to repository content

MEGA's customization capabilities provide end-user organizations with the ability to configure MEGA tools to meet their needs, including the ability to create custom queries, custom matrixes, custom document templates, custom website templates, custom programming language, and document generators.

Other features include automatic laptop synchronization for remote users as well as a variety of pre-built meta-models, which are available for ISO 9000, SAP/R3, and PeopleSoft.

#### **2.4. Integration with Other Products**

MEGA Suite provides various APIs and import/export formats that allow integration/interoperability with other products.

For third-party tools integration, MEGA embeds the following components:

- SCCI interface to version management systems, including Visual Source Safe, Telelogic Continuous, Rational ClearCase, and other SCCI compliant tools
- A spell checker from WinterTree Software Inc.

The MEGA Exchange module provides several import/export facilities, including

- Text-based import/export facility available for any repository object. It automatically selects the appropriate set of objects to extract according to links between objects and link semantics (i.e., ownership, reference, etc.)
- An XMI import/export facility for UML models
- A Rational Rose import/export facility for all UML models, including diagrams

A Microsoft COM compliant and .Net compliant API is provided for access to all repository objects, including meta-objects from the MOF structure.

The MEGA Designer tool uses ODBC to connect to relational databases and for reverse engineering their relational schemas. In addition, MEGA Designer can generate BPEL from workflow models and XML schema from class models.

### **3. Analysis and Process Modeling**

#### **3.1. Enterprise and Organization Models**

##### **Enterprise Architecture Models**

MEGA provides standard support for the Zachman Framework and Balanced Scorecard enterprise architecture models. MEGA also comes with an HTML service that provides a Zachman portal interface to the MEGA repository. This portal provides advice on how to apply best modeling practices in MEGA according to standard guidelines provided by the Zachman framework.

Concerning framework (and methodology) support, MEGA is very extensible. The MEGA Open Kit Approach (MOKA) provides an integrated and open methodology framework that can host any enterprise architecture/methodology to guide user activities during project modeling efforts. Consequently, should companies want to utilize specific methodologies (e.g., TOGAF, IDEF, LOVEM, etc.) to support their efforts they can do so using MOKA.

### **Organization Models**

Organizational analysis is one of the primary business modeling perspectives supported by MEGA Process. To support modeling of organizational structures and the relating of business processes to organizational units, MEGA provides the ability to create

- Organizational charts that link business processes and the persons responsible for their control
- Organizational viewpoints of business processes with Org-Units defined in Swim Lanes
- RACI analysis for defining Org-Units' responsibilities in terms of tasks and operations

Besides the ability to define an organizational view of business processes, MEGA provides a functional view that allows you to create an independent view of business processes that is valid for any kind of organization. For example, very large organizations may want to normalize the functional view of their core processes, but usually they have different organization structures in each country, due to history, culture, or regulation.

Functional and organizational views of business processes can be linked to each other.

### **Resource and Cost Modeling**

MEGA Process supports two dimensions for resource analysis – business function analysis viewpoints and organizational viewpoints.

The business function analysis viewpoint describes the enterprise skill set as a hierarchy. Business functions are consumed by activities in business processes. This analysis provides the basis for ABC projects.

The organizational viewpoint describes two kinds of resources – non-IT resources and IT resources. Non-IT resources can be categorized and have specific cost and time attributes in the simulation module. IT resources have a transaction point cost. IT resources can also be further analyzed in IT architecture models or used as resources in business process models.

### **Mapping Organization Strategies to Performance Measures**

MEGA offers several options for representing performance strategies and goals, including value chain analysis and Balanced Scorecard. (Other representations can be added.) Each of these can be mapped to the process areas and processes; the relationships defined throughout the models are propagated up to the strategy level.

MEGA supports project analysis for both strategy analysis and action plans. Strategy projects use Balanced Scorecard perspectives to organize goals into cause and effect chains.

MEGA also supports the simulation of processes and the linking of simulation results with organizational project goals and strategies (See Section 3.4).

### **Managing Process Portfolios**

Process portfolios are managed in MEGA Repository, which can handle up to hundreds of thousands of processes. MEGA's simulation engine can be used for vertical or horizontal analysis of large process value chains.

## **3.2. Defining Processes**

### **Defining Processes**

In MEGA, processes are described through the tool's graphical diagram editor. It is also possible to use the dialog editor for tabulated inputs when required.

### **How is Information Storage and Integrity**

All models are stored in MEGA's MOF-based repository, which ensures consistency according to the appropriate business process meta-models. (For more on MEGA Repository features and system administration/security, see Sections 2.3 and 9.1.)

### **Graphical Notations**

MEGA Process supports three views of business processes – functional, organizational, and IT. These three views can be linked together using the OMG's MDA approach.

The MEGA tool provides an open model editor, which includes a shape editor that allows users to define an entirely new set of shapes for each business process object. Further customization is also available for modifying the diagram behavior, or even to create a completely new business process diagram.

BPMN is supported in MEGA Designer for designing IT processes.

MEGA does not support UML 2.0 Activity diagrams. However, MEGA is a submitter at the OMG for the Business Process Definition Meta-model (BPDM). BPDM aims to provide a business view of Activity Models and a way to link business models and IT models, according to the MDA approach. Thus, it is reasonable to expect that subsequent versions of MEGA will support BPDM.

## **3.3. Subprocesses and Activities**

### **Handling Subprocesses and Activities**

In MEGA, processes and activities can be decomposed without any limit. Besides simple decomposition (i.e., sub-processes), MEGA Process provides the ability to connect process functional analysis (activities) to process organizational analysis (procedures). In addition, advanced control flow is provided for activity flows, including decision boxes. Decision flows have guards and probabilities.

### **Defining Activities**

In MEGA, activities and tasks are connected to Use Cases so that business requirements defined by business activities are transferred to Use Cases for further refinement to specify the software.

### **Documenting Decision Rules**

Constraints can be used to express business rules. Constraints have a rule expression that can use business dictionary terms from business data models.

### **Rules Entry**

See above.

### **Activity Costs, Resources, and Time Data**

MEGA supports ABC – the ability to add activity-based costs to business processes. These can be assigned to individual activities or to the whole process. Users can also assign costs based on whether they are for execution, transfer (in the case of a message), or processing. Various approaches can be adopted for calculating costs, including the duration of the activity or process, its physical cost, and/or human and other resource requirements. In addition, beyond standard time and cost attributes, MEGA's simulation module provides advanced features for analyzing activities.

## **3.4. Simulation**

### **Simulation Capabilities**

MEGA Process features a Discrete Event simulation engine that provides a number of simulation capabilities, including

- The ability to define simulation scenarios
- The ability to conduct simultaneous simulations of multiple scenarios
- Simulation scope management in terms of its breadth and depth, and the ability to target optimization of a local business process or a global value chain
- Advanced distribution laws
- Total control for activity flows
- Queue management
- Objectives and indicators for applying advanced metrics from simulation results

Advanced calendar capabilities for portraying human resource availability and business process event frequency

MEGA Simulation allows MEGA Process users to create multiple simulation scenarios for the full spectrum of processes, ranging from isolated business processes to entire value chains of processes. A comprehensive parameter set is provided for adjusting resource consumption and for defining organizational constraints. By applying indicators and customizable metrics, users can link MEGA simulation results with a project's objectives.

### **Analytic Capabilities**

MEGA Simulation's analysis features include tools for analyzing and summarizing simulation data and for applying various metrics.

MEGA enables aggregation of simulation results as a function of analysis requirements:

- At the elementary level, results are related to indicators that monitor each business process or procedure
- At the global level, results are related to consolidated indicators, enabling the aggregation of elementary results using simple user-defined calculation rules

Upon completing a simulation, MEGA generates an execution report documenting the simulated steps and any inconsistencies in the model. A resource load consumption table is also generated. All results are stored in the repository for use with other MEGA facilities (Web/Document Publisher, etc.). Users can also export results to Excel for further analysis.

MEGA Simulation also features the ability to animate simulation scenarios in step-by-step, pilot, or automated mode. It will walk the user through the entire process and subprocess chain, providing an overview and control of the simulated business processes and activities.

### **Real-time Data Utilization**

MEGA Simulation can import data from Excel spreadsheets. It also integrates with the Armstrong-Laing product, which supports real-time data feeds into process models for simulation.

### **Model Distribution and Simulation on Enterprise Networks**

MEGA Simulation features a dashboard capability for defining dashboard criteria for decision makers or project teams. Companies can also use the (provided) website template designed for business optimization projects to deliver simulation scenarios and results to project members. Many companies will want to integrate this project optimization website into their corporate intranet.

### **Statistical Fit/Data Analysis**

MEGA Simulation analyzes simulation results by applying indicators and other metrics. Based on mathematical formulae, these range from standard Excel formulae to complex user-defined Visual Basic algorithms, which could indicate, for instance, the number of processed orders, number of rejected orders, average processing time, delivery time, and so on. Users can also export simulation results to Excel for more advanced statistical analysis.

### **Capture and Reporting of Simulated Metrics**

MEGA Simulation provides standard documents (Word, etc.) and website templates to automatically deliver simulation reports. Simulation results are provided as tables and graphs for better readability.

MEGA includes an innovative simulation feature that allows users to analyze simulation results in relation to process improvement objectives. This alignment of simulation results with target objectives provides a powerful tool for associating objectives with a simulation and associating indicators with an objective (e.g., required value, corresponding value at warning threshold, etc.). For example, if you want to reduce delivery time, the "delivery time" indicator could have "7 days" as its required value and "10

days” as its threshold value. MEGA Simulator also automatically generates a summary report that includes an indicator graph presenting simulation results related to objectives, in effect, providing a “global view” of the executed simulation.

## **4. Business Process Methodologies**

### **4.1. Business Process Methodologies**

MEGA includes a set of ready-to-use methodologies, including MEGA’s proprietary approaches for business process modeling, application architecture, and application design. Standard methodologies such as Balanced Scorecard and Six-Sigma are also provided. For each deliverable that involves a business model, there is an associated template in the modeling framework.

However, MEGA does not champion any particular standard methodology but they have their own proprietary methodology that they support and which their own consultants use for MEGA consulting engagements. The MEGA modeling platform is also designed to enable users to configure the tool to support whatever approaches they desire. For this purpose, it includes a framework (MOKA) that is dedicated to methodologies. This framework is composed of

- A meta-model for methodologies (e.g., method, phase, resource, deliverable, etc.)
- A diagram for designing method phases and deliverables
- A project creation wizard for starting a modeling project according to a methodology template
- Website templates to generate both a methodology website and a project website

The MEGA methodology framework, combined with the tool’s MOF repository, provides an embedded and powerful set of guidelines and features for conducting modeling based projects. In effect, meta classes, diagram types, document templates, and website templates are all objects stored within the repository, thus allowing them to be linked to a method’s deliverables.

MEGA has used the MOKA framework to incorporate specific methodologies within its toolset. These include Six Sigma, Balanced Scorecard, and MEGA’s proprietary methods.

### **4.2. Six Sigma Support**

MEGA has made a concerted effort to fully support the Six Sigma methodology in the latest version of MEGA Process: All phases, deliverables, and required resources (e.g., black belt, green belt, etc.) are fully described.

MEGA also provides an HTML template that companies can use to create quickly a Six Sigma project portal that makes available to project collaborators all data and project documentation (e.g., project steps, resources, models, external documents, etc.) relating to a Six Sigma project. This portal enables access to the various projects created in MEGA, as well as the creation of new projects from the HTML interface.

## **5. Report Generation and Document Management**

MEGA Publisher is one of the three main components of the MEGA modeling platform. It includes two components – Document Publisher and Web Publisher.

Document Publisher provides a GUI to MS Word for extracting information from the repository in the appropriate layout. It also allows administrators to design high quality document templates that are then used by standard modelers for automated document generation.

All MEGA products come with a set of ready-to-use document templates such as “Business Process Definition Document,” “ISO 9000 quality manual,” “Org-Unit Job Description,” “Application Description,” etc.

Users can also email documents created within MEGA. The publishing service uses the distribution list to attach to the document in the MEGA repository. This service provides users with a way to initialize a validation workflow directly from MEGA.

Web Publisher provides a complete architecture for designing and generating project websites, including these modules

- Object exporter: Used throughout MEGA for automated discovery of the network of objects connected to a root object. Using object exporter, any repository object can be used as the source for a website
- Web page template editor: Provides a way to describe the web page layout associated to each object type
- Website template editor: Provides a way to select the root objects that will be part of a website, as well as which page layout template should be used for each desired object type
- Website generator: Uses website templates, web page templates, and the object exporter to build fully featured websites, compliant with client needs

## **6. Development Environment**

### **6.1. Language of Tool**

The MEGA platform was developed using Microsoft Visual Studio 2003. Languages used include C, C++, VBX Scripting and HTML.

The installation program is based on InstallShield X. WinterTree provides the spell checker. Lex&Yacc is used for parsing Rich Text Format (RTF). PKZip is used for repository data compression.

A large set of the product’s features use the repository’s MOF kernel and the generic engines underlying the platform. All meta-models, diagram types, property tabs, menus, and queries are declared objects in the repository, meaning customers can natively extend them to meet their needs.

### **6.2. Product Support, Maintenance, and New Versions**

New product versions are released yearly. Major version updates (called Service Packs) are released once or twice a year. Minor updates are provided as cumulative patches. All updates are provided as packaged setup programs.

MEGA provides worldwide technical support, with regional support centers located in Paris and Boston. MEGA technical support provides

- Telephone support during local business hours
- Email support during local business hours
- Online support via support Website
- Escalation process (i.e., calls upgraded to the appropriate engineers/developers) depending on severity and complexity
- Updates – Customers can download latest releases
- Fixes – Customers can download latest Services Packs
- Online customer service – Customers can log, monitor, and update calls via the Internet

A central online knowledge base providing advanced queries for troubleshooting problems is available on the web support site.



## 7. Software Modeling and Code Generation

MEGA Designer supports application component design and integrates with standard development environments. It also provides code generators as outputs for use with development projects when architecture/design projects have reached their final phases.

MEGA Designer includes a full implementation of UML 1.4 models. UML meta-models (created in Designer) are linked to business process meta-models (created in MEGA Process) and IT architecture meta-models (created in MEGA Architecture). As a result, the combined toolset provides a comprehensive model driven approach for enterprise architecture design and modeling.

MEGA Designer supports generation and reverse engineering of different source components including

- BPEL code generation from workflow models
- XML schema generation and reverse engineering from class models
- Java code generation and reverse engineering from class models
- SQL code generation and reverse engineering for relational models
- Automatic synchronization of relational models with class/association models

### 7.1. UML Model Generation

MEGA Designer includes a full implementation of UML 1.4 models.

### 7.2. BPEL Generation

MEGA Designer generates BPEL code from workflow models.

## 8. Templates and Frameworks

MEGA provides standard libraries whenever those frameworks have enough stability and clarity both in terms of content and in terms of meta-models.

MEGA currently provides the following standard libraries:

- Basel II Risk Type Library: Includes a standard list of risk types and parameters as defined by the Basel II committee for risk assessment for financial institutions
- ISO 9000 Chapters: Includes a standard list of ISO chapters and parameters for quality management and certification
- Six Sigma Methodology artifacts and templates

Large customers such as British American Tobacco have implemented the SCOR model in MEGA. However, according to MEGA representatives, they have not found agreement during business consulting engagements regarding the definition of business processes, business functions, and business collaboration among the SCOR community and other modeling tool vendors. Consequently, MEGA has chosen to implement the SCOR framework according to each customer requirement via its consulting teams.

MEGA is also working with the TeleManagement Forum to help rationalize the specifications for the TeleManagement Framework using the new Business Process Meta-model under development and the OMG's Model Driven Approach (MDA).

## 9. Systems Administration and Security

MEGA provides advanced features for teamwork management, security management, and enterprise repository management.

**Transaction and Private Workspace.** The MEGA Repository provides features that enable users to work in private transactions through private workspaces:

- Users have access to the entire repository in the state available at the time they started a private transaction.
- Users can update privately their models without showing these updates to other users.
- Users can refresh their private workspace from the latest state of the public workspace while keeping their private updates.
- Users can dispatch their updates to the public workspace when they have finished their work or they can discard their private updates when they are not satisfied with the work being done.

**Object Access Rights.** The Supervisor Module includes an access rights service to secure object modifications:

- An administration console provides graphical management of user access rights.
- An access rights hierarchy provides permissions for a set of users.
- Users can only update objects for which they have permission rights.
- Administrators can change permissions associated with each object by assigning to them a higher or lower security level.

**User Profiles.** User Profiles enable the administrator to control access to the modeling desktop features. User Profiles define

- A level of object access rights
- Restricted views of the meta model
- Restricted access to administration options (object deletion)
- Restricted access to design tools (simulation, data model alignment)
- Restricted access to products (MEGA Process, MEGA Architecture, MEGA Designer, etc.)

**Unified Login.** MEGA supports the Single Sign On (SSO) protocol that offers unified login and advanced security for user authentication and password management.

**Version Management.** MEGA provides a coordinated set of tools for managing versions, including

- An export tool that can export any repository object and its components into an external file
- A comparison tool that can compare an exported repository object and its current state in the repository
- A merge tool that can select and align a repository object according to an exported version
- The ability to export files that can be stored automatically in change management system through the SCCI interface

In addition to the software tools just described, MEGA also provides an accompanying enterprise repository management methodology designed to help companies build their organizational structure for a successful enterprise repository implementation.

## 10. Scalability

**Volume Scalability.** MEGA can handle repositories starting from a single modeler up to hundreds of modelers working simultaneously on the same repository:

- Number of users: unlimited
- Users working simultaneously on single repository: 512
- Number of objects in a single repository: about 4 million

Effective content volume: from 512K to 4GB  
Required disk volume: from 512MB To 10GB

**Deployment Scalability.** The MEGA platform provides three deployment models – stand-alone workstation, client-server, and thin client-server. (See Section 2.1 for more on deployment options.)

MEGA's simulation module includes the ability to define simulation scenarios. Scenarios define both the breadth (which processes in the value chain) and depth (how deep in each process) of the simulation. Thereby, MEGA Simulation can target process optimization for a local business process or for a global value chain. (For more on MEGA Simulation, see Section 3.4)

## **11. Platforms**

MEGA is available for Windows operating systems, including Windows 2000 (with MS Office 2000) and Windows XP (with Office XP). Repositories can be hosted on Unix servers including Linux.

## **12. Pricing**

MEGA Software is composed of analysis and modeling products as well as various add-on options and technical modules for customizing and administering the repository and end users.

MEGA Software is sold either through fixed (i.e., per workstation) or concurrent user access licenses. Maintenance includes technical support for product use and major new version upgrades. Maintenance and support fees are equal to 18% of total price.

### **Eight-User License for BPA Project for MEGA PROCESS (alone)**

For 8 users the standard configuration is the following:

8 MEGA Process  
1 MEGA Administration console (including Publisher)  
Total: 25,200€

This configuration (as well as others described below) provides the ability to deploy the enterprise repository (generated by MEGA) to all company stakeholders, regardless of their number.

### **Eight-User License for Enterprise Architecture Project**

For 8 users the standard configuration is

6 MEGA Process  
2 bundle product, MEGA Process + MEGA Architecture  
1 MEGA Data option (data modeling)  
1 MEGA Administration console (including Publisher)  
Total: 27,000 €

### **32-User License for BPA Project for MEGA PROCESS (alone)**

For a 32-user system, the configuration is

32 MEGA Process  
1 MEGA Administration console (including Publisher)  
Total: 56,925 €

### **32-User License for Enterprise Architecture Project**

For a 32-user system, the configuration is

24 MEGA Process

8 Bundle product, MEGA Process + MEGA Architecture  
4 MEGA Data option (data modeling)  
1 MEGA Administration console (including Publisher)  
Total: 66,825 €

## **13. Company, Product Positioning, and Support**

### **13.1. Company Background Information**

MEGA International was founded in 1991, and is headquartered in Paris, France. Company focus is on Europe and North America, with operations and affiliates in the US, UK, Germany, France, Italy, Canada, Mexico, and Central and Eastern Europe.

MEGA has approximately 170 employees, with more than 100 consultants specialized in business process and enterprise architecture. It has more than 1,000 clients in more than 30 countries, and reports 30,000 users worldwide. Annual revenues are approximately 22 million Euros (split 46% product and 54% consulting).

MEGA is recognized as an industry leader by research firms, including Gartner, Forrester Research, META Group, and various standards organizations like the OMG, BPMI, and the OpenGroup.

MEGA can point to a profitable and consistent 25% year over year revenue growth, and delivery of more than 15,000 consulting engagement days per year.

### **13.2. Positioning**

MEGA has positioned MEGA Suite to support a range of EA modeling and BP change activities, including

- Enterprise architecture modeling and analysis
- Process modeling and analysis, redesign, and improvement
- Detailed process modeling and analysis
- IT support/software development
- Human performance improvement initiatives
- Development of management and measurement systems

MEGA has made a considerable effort to provide the features and functionality necessary to position its product to support the full spectrum of enterprise architecture and business process management needs. When used together in conjunction with other MEGA modules, MEGA Process, MEGA Architecture, and MEGA Designer combine to provide a single platform that supports business process modeling, enterprise architecture, IT architecture and component analysis, and systems design efforts, while its simulation capabilities support detailed process modeling and analysis. The addition of various frameworks and methodologies – including Zachman, Balanced Scorecard and Six Sigma – make it well suited to support human performance improvement efforts and to develop management and measurement systems. Finally, the pre-built templates provide project management capabilities that companies can use to create quickly websites for assisting with various enterprise architecture and business process management initiatives.

### **13.3. Product Training**

MEGA offers various product training and product support services. Training sessions can be conducted on customer sites for a group of 8 to 10 participants. Training is also available at MEGA.

### **13.4. Business Process Consulting**

MEGA offers a variety of client services including

- Value chain management
- Business process improvement
- Operational risk management
- Business process and IT systems alignment
- Best practices selection and installation
- Quality management

MEGA has organized its industry expertise into four industry groups with consulting directors appointed to ensure customer value delivery in four sectors: Banking, Insurance, Manufacturing and Services.

#### **14. Case Study**

A domestic insurer for private individuals used MEGA PROCESS to identify, document, and optimize key business processes – and to standardize best practices – across the entire organization. This large insurer (with a turnover of EUR 3,290 million in 2001) has 7,200 employees, 4.3 million clients, and 3.25 million insured households.

**Teams.** MEGA consultants worked jointly with the company's dedicated teams to build a business process repository. The objectives of this repository project included

- Fostering knowledge transfer and consolidating company know-how
- Facilitating the implementation of internal projects and federating them
- Preparing for the automation of processes within the context of a workflow
- Improving the quality of services delivered to their clients

**Project Scope and Objective.** A key dimension of the project involved taking into consideration the company's organizational structure, consisting of the head office and 11 operational divisions (i.e., regions), which are geographically distinct and which have their own regional practices. The goal was to highlight core business processes while taking account of any specific regional requirements. The customer team was represented by ten architects who used ten product licenses to support the project.

**MEGA's Contribution.** Having validated the scope of the project, the first step required designing a global map of the company's core processes, which, in effect, defined the organization's value chain. These processes were divided into three categories – monitoring, operations, and support – with the main emphasis focused on operational processes. These, in turn, had a special focus on subscriptions, contract lifecycles, and claim issues. Before building the repository, the customer, with “experimental” processes, tested and validated the approach that had been put together.

Preliminary results of this experimental phase were threefold. First, a unitary methodology (based both on the MEGA Process modeling tool and the MEGA process modeling approach) was adapted to the client's needs. This resulted in a unifying project that brought together all ongoing initiatives, which, in turn, resulted in a first process, deliverable in the form of a working intranet.

To build a consistent repository that would take into consideration regional process specific requirements, the following cycle was implemented in order to define the future “to be” business process map, while involving all stakeholders through every step of the project:

An analysis of the “as is” situation (with inputs coming from one representative region) was conducted

This analysis was compared with two or three key regions to identify differences, and, wherever necessary, a comparison with all other regions was also conducted

Finally, a “to be” map was created based on regional best practices

After 2 months, approximately 30 processes, 180 procedures, and 200 operating modes were designed to support the business process repository, which is considered the entry point for all subsequent strategic projects carried out by this client. As a result, ten processes have been accommodated with another five in progress. The results are accessible by all employees via the corporate intranet.

## 15. Company Offices

MEGA International, headquartered in Paris, France, and founded in 1991, focuses on Europe and North America with operations and affiliates in the United States, United Kingdom, Germany, France, Italy, Canada, Mexico, and recently in Central and Eastern Europe. See website. [www.mega.com](http://www.mega.com) for a list of representatives.

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# System Architect

Version: 10

## Popkin Software

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 Web: www.popkin.com Email: sales@popkin.com

### 1. Product Overview

System Architect® is a comprehensive and powerful modeling suite that provides the ability to model, analyze, publish and plan all phases of business and technology. It integrates a full range of tools for supporting enterprise architecture including standard modeling notation for strategy, business process, relational data, object-oriented, application, and infrastructure modeling. These capabilities are part of a repository-based, multi-user solution that is scaleable and extensible. System Architect offers analytical functions including impact analysis and discrete event simulation. It is complemented with native support for Microsoft Visual Basic for Applications to enable users to add custom automation.

### 2. Product Architecture

System Architect is a Windows-based application and is typically hosted on a client workstation or laptop. The repository database is logically separate from the application and in a network configuration typically resides on a database server. Users can also have a complete installation on a single PC, with both the application and the underlying database co-residing on the same machine.

Modeling is done in the client environment, and all diagrams, symbols and definitions are stored in a Microsoft SQL Server repository.

Server-based stored procedures are used wherever possible. This reduces network traffic between client and server, and provides for faster execution of compute-intensive operations. This architecture has enabled System Architect to meet scalability and response time goals using a single, multi-user shared repository both in the lab and in the field.

Table 1 describes the various product options for System Architect.

**Table 1 System Architect Product Options**

System Architect	System Architect® is a comprehensive and powerful modeling solution designed to provide all of the tools necessary for development of successful enterprise systems. It is the only tool to integrate, in one multi-user product, industry-leading support for all major areas of modeling, including business process modeling, object-oriented and component modeling with UML, relational data modeling, and structured analysis and design. All functionality is harnessed within System Architect's extensible repository with native support for Microsoft VBA. System Architect's latest version provides Simulation capabilities.
System Architect DoDAF	System Architect includes a DoDAF option that provides specific support for the US Department of Defense's Architecture Framework (DODAF). The framework is at the heart of C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance), which itself is used by the US military to support the planning, decision making, and execution of integrated battle scenarios as well as business systems.



DODAF Option with ABM	The DODAF option can be extended with Activity Based Methodology (ABM). ABM enforces a particular order on the creation of DoDAF products and provides facilities for automatically generating appropriate matrices and models.
System Architect Compare	SA Compare™ enables you to compare the contents of two System Architect repositories, providing you with the information you need for successful project management.
System Architect Information Web Publisher	System Architect Information Web Publisher™ enables companies to quickly and efficiently build, deploy, and maintain content-rich Web sites based upon models and data held in the System Architect repository.
Integrated Reference Model Architect	The Integrated Reference Model Architect (iRMA) is enables users in federal agencies to support the Federal Enterprise Reference models from the OMB. With iRMA, users can satisfy many of the architectural requirements of the Exhibit 300.
XML Architect	Are you looking for a better way to extend and modify your XML schema? Or are you about to start your first XML project? Regardless of your XML experience, XML Architect™ will help you increase the accuracy and speed of your design process. XML Architect offers a fully graphical interface for your XML schema creation and editing.
The TeleManagement Forum Toolkit	The TeleManagement Forum's flagship program NGOSS (New Generation Operations Systems and Software) delivers a toolkit to guide the development of Business and Operations Support Systems (BSS and OSS respectively) and defines a strategic direction for a more standardized OSS marketplace.
The Popkin Model Agency	Are you looking for a set of pre-built models to give you a jump start on your current development project? Popkin offers a selection of industry-specific models created by the best companies in your industry. The Popkin Model Agency is a directory of industry and technology standard models, all of which are available as a Popkin encyclopedia, making the comparison and selection process of adopting a pre-defined model simple and efficient.

**2.1. Architecture Overview**

Figure 1 provides an overview of System Architect. At the core of System Architect is a metamodel which defines all the object types, their properties and relationships. A repository is an *instance* of the metamodel. Using these, System Architect can support a wide variety of interfaces and notations. Similarly, users can tailor interfaces or notations for special needs. The Figure shows an overall interface based on the Zachman Framework. In this case the various diagrams and notations supported by System Architect are organized so they can be accessed when a user clicks on one of the cells in the Zachman matrix. If the tools were being used by another organization, the initial interface could picture, for example, a TOGAF framework or a DoDAF framework and organize the artifacts in the repository according to the paradigm embraced in one of those approaches.

From this interface, managers, analysts, or developers can access a very wide variety of diagramming environments with diverse notations. If desired, the user could create a tailored notation. All data entered from any diagramming environment is stored in a common SQL Server-based repository and remains available whenever users seek to develop new models. The ability to support different groups developing different types of models makes System Architect very popular with teams developing enterprise architectures and systems.

Users can access the repository in a variety of ways to browse, generate reports or access information. Access via XML, MS Office and HTML are all possible.

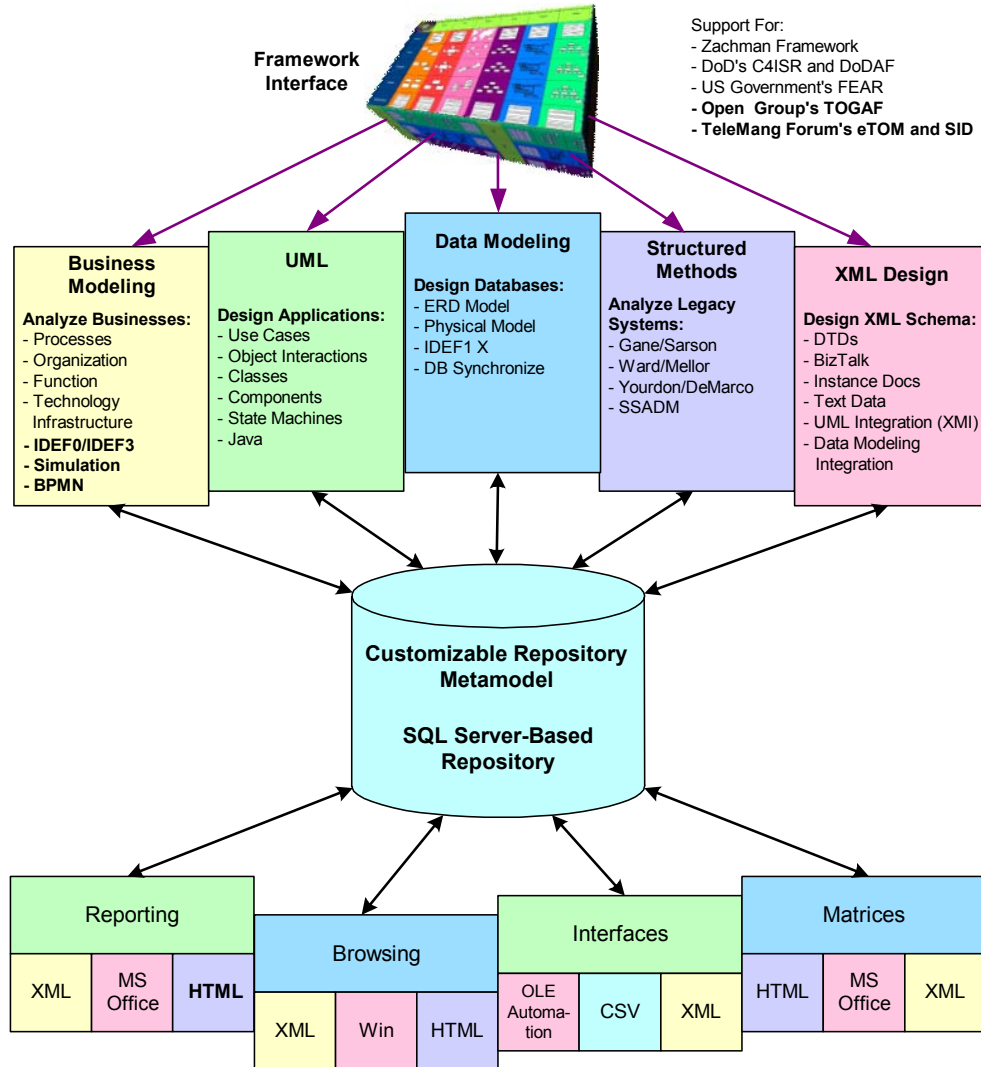
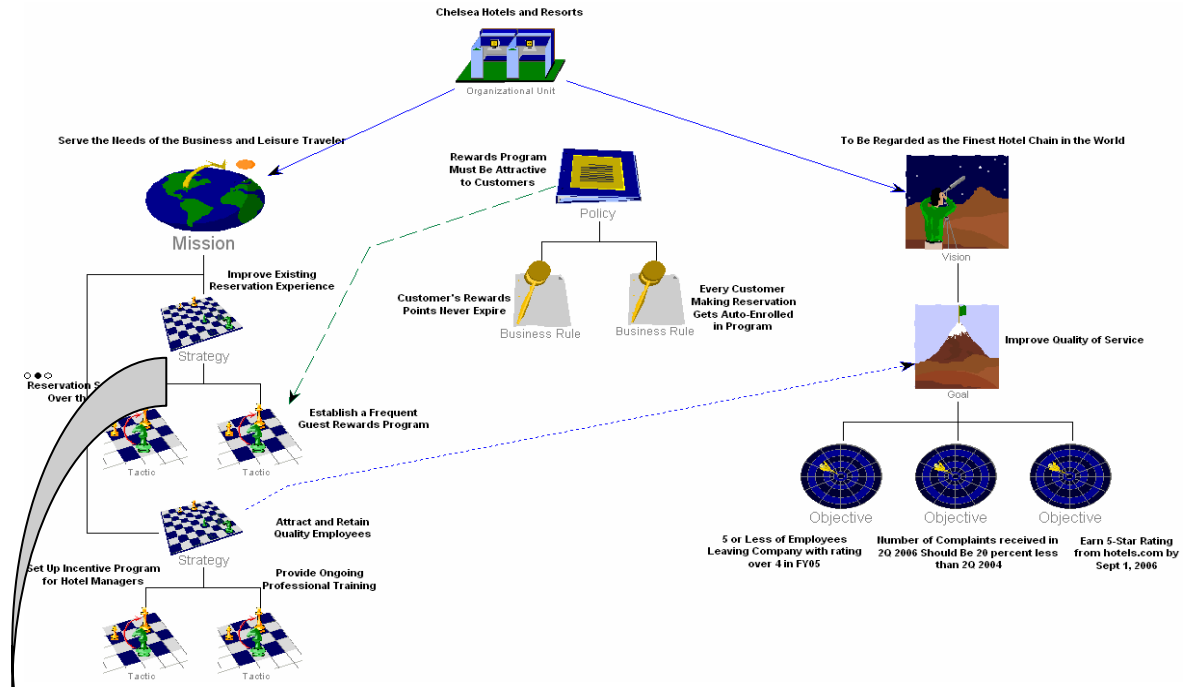


Figure 1. An overview of Popkin's System Architect.

## 2.2. Usability and User Interface

System Architect and the knowledgebase it provides are targeted to both business and technical users. System Architect provides different functionality for each user group. Business users are able to view process information by means of a variety of models and tables that capture and document information about business goal, strategies, organization models and enterprise architectures.



These high level business concepts can then be linked to the process diagrams that describe their implementation and the organizations and roles responsible for their execution.

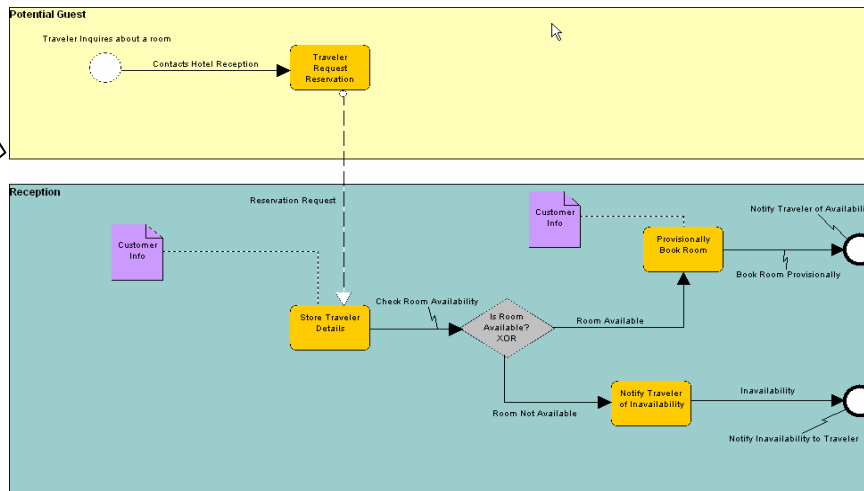


Figure 2. Business Process Diagram using BPMN

More technically oriented users can drill down on these process descriptions to see the technology that supports each business process, and by extension, high level business goal, strategies, etc.

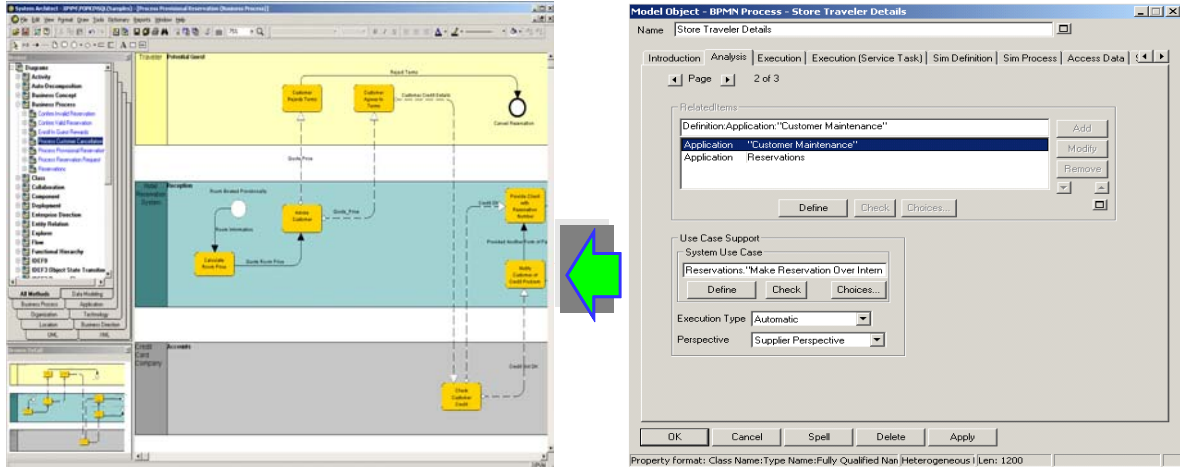


Figure 3. Business Process Diagram and an underlying Process Definition

This end-to-end view of IT / business alignment can be visualized and analyzed using the System Architect Explorer diagram which allows users to ask questions and get answers. A typical question that can be answered with the Explorer is “How have we aligned our process and technology with business objectives?” (See Fig. 4.)

By providing a view of the enterprise appropriate to each user’s perspective, System Architect dramatically increases the value derived from process modeling initiatives.

Users create process models in the System Architect client application. This modeling environment allows users to browse the contents of the repository, encouraging the re-use of existing definitions and integration with the entire enterprise.

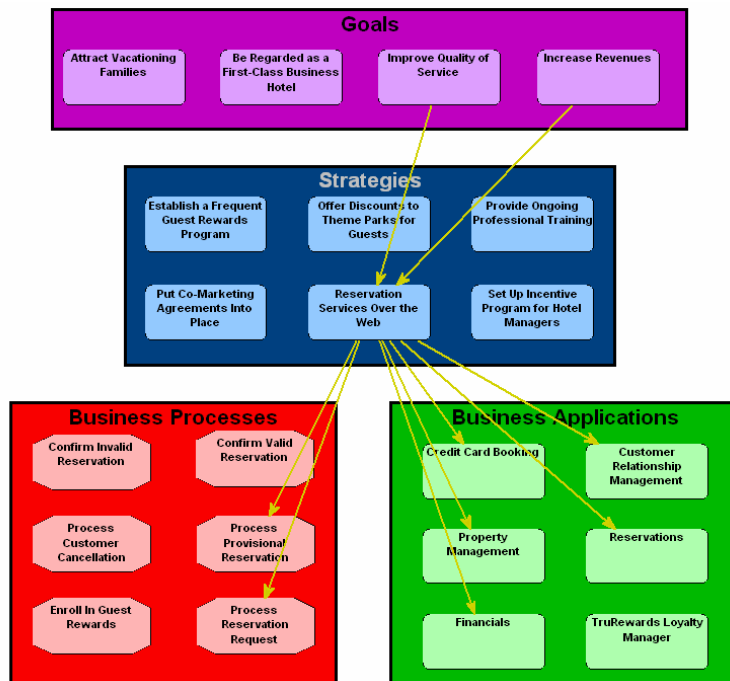


Figure 4. Explorer Diagram showing Linkages among Strategies, Goals, Processes and Applications

Information can be communicated across the enterprise using Web publishing. The System Architect InfoWebPublisher applies XSL stylesheets against XML output to produce detailed views of the enterprise models in HTML and scalable vector graphics (SVG) files.

### **2.3. Repository Options/Team Development**

System Architect is based on a repository as pictured in Figure 1. The System Architect repository is stored in a SQL Server database. System Architect supports team design and development and allows modelers to check out items and lock them while they are being changed.

### **2.4. Integration With Other Products**

System Architect supports numerous industry standard interfaces including BPEL for integration with BPM suites, XMI for UML, IDL for IDEF, and XML. In addition, System Architect customers can use products from the third-party Metadata Integration to exchange data with ERwin, Oracle Designer and other data modeling tools. All information can be imported and exported in XML and CSV formats.

In addition to these interfaces, System Architect has a COM-enabled API. Users can write macros in Visual Basic for Applications 6.3, which ships with the tool. This API exposes the entire System Architect metamodel, provides for integration with Microsoft products including MS Office, Visio and Project. VBA macros can automate many System Architect tasks and implement additional logic.

## **3. Analysis and Process Modeling**

### **3.1. Enterprise and Organizational Models**

System Architect supports a number of popular enterprise models and provides several ways of modeling organizations.

#### **Enterprise Architecture Model**

System Architect has full, out-of-the-box support for the Zachman, TOGAF, DoDAF, TMF and FEA architectural frameworks/reference models. Enterprise Direction, Strategy Map, and Stakeholder Relationships diagrams are supported. System Architect provides a framework editor that enables users to configure the details of these implementations in order to meet specific customer preferences. Users can also use the framework editor create custom frameworks.

System Architect captures a great deal of information outside of simple process descriptions. Information describing organizational structure, data structures, technology infrastructure, etc., can be maintained in System Architect and related to process definitions and flows. Additional relationships can be created to meet user modeling needs. A matrix can be used to visualize and instantiate a relationship. Simple two-dimensional and multi-dimensional inferred relationships are supported. This information can be supplemented with metrics describing cost, schedules, for used in process simulations.

#### **Organizational Model**

System Architect supports hierarchical organization models, and the roles that make up a given organizational unit.

#### **Resource and Cost Modeling**

As a user defines activities, he or she can identify the resources and costs associated with a given activity. Later, using simulation, the costs and resources can be used as a means of performing comparisons among alternate scenarios.

#### **Measures**

System Architect supports metrics in the form of a performance measures. A performance measure is a type of measurement, such as percent of sales opportunities closed in a given month. These



performance measures are tied to business objectives to identify how a particular objective will be measured. Business Targets may be defined for a business objective. Thus, a business objective may have a specific target and a performance measure for determining progress toward the objective. The third leg of this triad is the measurement definition. A measurement is essentially a one piece of recorded data that is associated with a performance measure.

### **Managing Process Portfolios**

A portfolio of processes can be managed and associated with Balanced Scorecard performance measurements or other measures such as the Federal Enterprise Architecture Performance Reference Model (PRM).

## **3.2. Defining Processes**

### **Define Processes**

System Architect allows users to define processes using any of the popular methodologies and associated notations. Among these are Business Process Modeling Notation (BPMN), Catalyst, and Integrated Definition Models (IDEF).

### **Process Information Storage and Integrity**

All information from all models is stored in the repository and is available for use with any other model.

### **Graphical Notations**

System Architect supports BPMN Business Process diagrams, Catalyst Process Charts, IDEF3 Process Flow diagrams, UML Use Case and Activity diagrams, among others. Users can also create custom notations and diagram types. All process types are supported by an atomic definition that is created and stored in the repository. Process definitions have unique names and contain additional information as is relevant to the modeling notation in use. These definitions can be instantiated during diagram creation and reused across multiple diagrams. In the System Architect metamodel, diagrams contain symbols, and symbols are defined by definitions. Each symbol is unique, but symbols can reference common definitions. When creating new symbol, the user can create a new definition, or select an existing definition from a browser.

## **3.3. Subprocesses and Activities**

System Architect supports the decomposition of processes into subprocesses and activities. Process models indicate when a given subprocess can be examined and using a mouse one can store process information and explore a large scale process to any depth needed.

### **Handling Subprocesses and Activities**

Subprocesses are represented through decomposition diagrams that are linked to a process symbol. System architect allows users to easily navigate decomposition diagram hierarchies. Any number of nested levels of decomposition is supported. Processes can also be decomposed into process steps, which are implemented with definitions. These process step definitions are not typically represented graphically.

### **Documenting Decision Rules**

Decision rules are typically represented with junction or decision point symbols and definitions as is appropriate to the notation in use. These definitions can represent Boolean or more complex logic and can have distributions and other statistical information associated with them.

### **Activity Costs, Resources, and Time Data**

System Architect allows users to capture extensive data on activity costs, resources and times required. This information is used in Discrete Event Simulation and can be documented on reports. Activity-based costing is supported for the Catalyst Process Chart and IDEF0 Function/Activity diagrams.

### 3.4. Simulation

Dynamic analysis is provided by the integration of System Architect with Lanner's Witness® discrete event simulator to provide a cost-effective and timely solution for making major business decisions. The resulting product offering, Popkin Simulator II, supports simulation of process diagrams, including process decomposition diagram hierarchies.

#### Analytic Capabilities

Simulation can be used to analyze and optimize cost structures, resource utilization performance goal attainment, etc. Process models, simulation parameters and results can be shared across an enterprise network. Results can be captured, shared and reported in spreadsheet, graphical and proprietary result file formats. Static analysis of alternate scenarios can be produced using System Architect's Explorer diagram. Visual impact and gap analysis can be easily produced using this facility.

## 4. Business Process Methodologies

### 4.1. Business Process Methodologies

System Architect supports a wide variety of business process methodologies and notations, most notably the Business Process Modeling Notation (BPMN). BPMN is a notation created by the Business Process Modeling Initiative (BPMI), intended to be a notation that could be easy to use and readily understandable by all business users, but at the same time designed with web services in mind, so that complex message passing between businesses or parts of businesses can be modeled. Because of this, it is gaining momentum as a business process modeling standard in the commercial industry. Support for BPMN is integrated within System Architect's overall support for Enterprise Architecture, enabling most off-the-shelf business modeling methods, as well as home-grown methods, to be applied.

Popkin provides support for The Open Group's Architectural Framework (TOGAF) in the tool's standard configuration. The System Architect user interface is configurable and can easily support client-specific implementations of these and other methodologies.

System Architect also supports the IDEF (Integrated Computer-Aided Manufacturing (ICAM) DEFINITION) methodology, which has been and remains a standard in the US government space. System Architect integrates support for leveled IDEF0 functional models, IDEF3 process models and node tree diagrams, IDEF3 state models, and IDEF1X data models. System Architect's UML support includes Use Case and Activity Model diagramming, and an interface is provided to map BPMN business process diagrams to UML Use Cases.

Popkin Software provides a DoDAF version of System Architect, which is heavily used in both the US and International governments to create workproducts for the Department of Defense Architecture Framework. Beyond that, Popkin also offers a DoDAF version of System Architect that particularly supports the Activity Based Method (ABM™) for DoDAF, developed by MITRE Corporation.

System Architect continues to provide integrated support for the traditional data flow diagramming techniques of Structured Analysis, including the Gane/Sarson and Yourdon/DeMarco, and Ward/Mellor real-time analysis techniques.

System Architect's UML support can also be used stand-alone or integrated with the other methods, and Popkin provides working papers and add-ins for clients wishing to perform RUP.

Integrated with the business and systems modeling methods is support for relational data modeling, via independent logical and physical data models, which may be mapped to and from one another and to and from UML Class diagrams. Physical data models in System Architect may be synchronized with Oracle and SQL Server databases through System Architect's DB Synchronize tool. Schema generation and reverse data engineering are supported for DB2 and other databases.

## **5. Report Generation and Document Management**

System Architect can create reports in RTF Text, MS Word, MS Excel/CSV, MS Access and HTML/XML/XSL/CSS formats. These reports can document specific definitions and/or diagrams, a subset of the repository contents or the contents of an entire repository. The product is delivered with many standard reports, many specific to the process modeling domain. Using SA Information Web Publisher, customers can create integrated websites with a great deal of control over content and formatting. Output is generated in XML, and style sheets are provided for out-of-the-box formatting. Client-specific formatting is accomplished using industry standard XSL and CSS. Graphics are generated in Adobe SVG format, providing complex graphics functionality including zoom, decomposition diagram hierarchy and links to external documents.

Any System Architect definition and associated symbol can be linked to an external document or hyperlink, including documents stored in most document management systems.

## **6. Development Environment**

### **6.1. Language of Tool**

System Architect is developed in Microsoft Visual C++ / Microsoft Foundation Classes with a Microsoft SQL Server backend. System Architect can be automated with Visual Basic for Applications. Web Based interfaces and outputs use XML/XSL.

### **6.2. Product Support, Maintenance and New Versions**

Popkin Software provides technical phone support for maintained customers. It also provides live links on each page of its help system for users to request more information, and provides a detailed FAQ section on its website. Popkin development targets a major release per year with 3 – 4 maintenance releases in the intervening period. Customers who are current on maintenance have access to upgrades. Upgrades are announced via the Popkin website, email blasts, newsletters and user groups.

## **7. Software Models and Code Generation**

System Architect generates Java, C++, Visual Basic and .NET code.

### **7.1. UML Model Generation**

System Architect supports all diagram types of UML 1.4. UML models developed in System Architect can be shared with development environments via XMI.

### **7.2. BPEL Generation**

System Architect generates BPEL for use by BPM systems. Using BPEL, System Architect has been integrated with Oracle® BPEL Process Manager, a Service-Oriented Architecture (SOA) and integration platform that complements Oracle Application Server 10g. Using this vehicle and System Architect's Simulator add-on, BPMN Process models in System Architect can simulated and then executed and monitored for closed loop business process management (BPM).

## **8. Templates and Frameworks**

System Architect provides a Framework Manager that enables users to view and access the models and artifacts they have developed through a Framework Browser user interface. System Architect comes prepackaged with Framework Browsers for the Zachman Framework, the Department of Defense Architecture Framework (DoDAF), and The Open Group's Architecture Framework (TOGAF).

System Architect provides has add-on support for the TeleManagement Forum's templates and frameworks, which are provided free to TM Forum members. Popkin provides a pre-built repository with the latest eTOM and SID models. The eTOM support delivers a complete high-level process map covering all areas of telecom business processes, from strategy through fulfillment, assurance, and billing. The SID models, in UML notation, provide a detailed application-oriented view of the data and associations required to support the telecom business. Global relationships across the NGOSS models can be visualized through System Architect's Enterprise Explorer diagram, which distills the SID detail into a high-level perspective that illustrates the key data areas required across the telecom organization.

The Popkin Model Agency provides repositories with pre-built data and UML application models for banking, retail, finance, healthcare, insurance, and other industries. In addition, Popkin is currently developing support for other verticals as part of ongoing engagements with existing clients.

## 9. Systems Administration and Security

System Architect is supported with a multi-user repository in which permissions and access rights can be managed at a very granular level and assigned to users/groups. Administrators use SA Catalog Manager, a separate console application, to control information login, information access and the availability of functionality. In addition, the database repository platforms provide user administration. Project workgroups can work from a central repository, or workgroups can have individual repositories that are merged into a master database. System Architect provides functionality and utilities to facilitate this extract – compare – merge workflow.

## 10. Scalability

System Architect has been tested to 100 concurrent users working from a single repository. Locking mechanisms manage concurrency while allowing read-only access to information potentially being modified. Large and disperse deployments are often implemented using terminal services, a technique that has proven successful for many customers. Small workgroups are supported down to the individual user. The MSDE installer and license that is bundled with System Architect facilitates the creation of a local repository database. A repository management utility is provided with System Architect.

Large process models can be simulated, and the Simulator II product supports multi-level process diagrams with child/decomposition diagram hierarchies.

## 11. Platforms Supported

The client portion of System Architect runs on Windows 2000/XP and is compatible with leading terminal services technology. The repository can be installed on Microsoft SQL Server 2000. A license for Microsoft SQL Server Desktop Environment ships with System Architect for standalone and small workgroup installations. An Oracle version of the product is scheduled for release in 2005.

## 12. Pricing

A single, concurrent license for System Architect costs \$5,775.00. GSA pricing is available.

## 13. Company, Product Positioning, and Support

### 13.1. Company Background Information

Popkin was founded in 1986. Early on, Popkin's System Architect would have been characterized as a CASE tool. In the Nineties it would have been characterized as an analysis and design tool, or as an

object-oriented modeling tool. Currently, System Architect is usually classified as a enterprise architecture or a process modeling tool. It could just as well be classified as an XML tool, a simulation tool, or a Web Services tool. In fact, it is all of these and benefits from its rich heritage. The company has sold some 90,000 licenses and System Architect is one of the best known process modeling and software automation tools. The company has distributors throughout the world. It is currently growing at approximately 20%.. Popkin is established and stable and can provide a stable long-term partner for any company's business process change effort.

### 13.2. Positioning

System Architect has considerable strength in several areas. It is widely used for Enterprise Architecture efforts, especially by the US Government. It is a popular tool among business analysts for process analysis and redesign efforts, who appreciate that it can support a wide variety of different notations and techniques, including BPMN and simulation. And it is popular with IT developers who like the fact that they can use business models to generate UML or BPEL code or XMI for transferring models to other environments, like Rational Rose.

### 13.3. Product Training

Popkin offers an extensive training program with courses throughout the year. Some course teach the use of System Architect, some teach business process concepts and others teach the use of various popular frameworks and methodologies. If you would like more information relating to the other courses, please contact [sales@popkin.com](mailto:sales@popkin.com) , or go to [www.popkin.com](http://www.popkin.com).

### 13.4. Business Process Consulting

Popkin offers consulting in support of clients who are using Popkin products. They help clients define problems, tailor tools and offering mentoring on initial projects.

## 14. Case Study

**Executive Summary.** Consortium Book Sales & Distribution is one of the largest independent book distributors in the US, handling sales and distribution for more than 90 independent publishers in North America, Europe and Australia. Under new ownership in 2001, Consortium faced the daunting task of updating its dated 1960s technology infrastructure to deliver the information managers needed to make better decisions and to provide more timely, flexible reports to its client-base of publishers and book sellers. Using its Whole System Design methodology, Integrated Knowledge Systems, Inc. used Popkin's System Architect to create a new data warehouse for data collection, dissemination and reporting; to generate a detailed list of business and technology requirements for selecting a new system; and to guide the configuration and implementation of that system. The new system, and access to timely information in a flexible format from the data warehouse, have been key factors in Consortium doubling in size since the project began.

**The Challenge: Focusing on Leveraging Information.** As one of the largest independent book distributors in the US, Consortium plays an important role in helping independent publishers get their books out to buyers by handling back-end operations such as sales, marketing, fulfillment, returns and warehousing for its publishers. With a family-style working environment and 50+ employees, Consortium has developed a strong reputation for excellent customer service during the past two decades.

In December 2001 Consortium was bought by Don Linn, a former Wall Street investment banker, who recognized the business potential. One of his first priorities was to evaluate various aspects of business operations. To begin, Consortium executives pinpointed three immediate goals: Develop a strategic plan, streamline business processes using technology, and enhance the quality of communications. A



strategic plan was developed, and improving the efficiency of business operations using technology emerged as a key priority.

The technology challenges were enormous. Two, UNIX-based PICK systems handled almost 80 percent of the company's operations, including accounting, finance, fulfillment, order processing and general inventory management. The PICK database / application environment, developed by Dick Pick and IBM in the late 60s/early 70s, was functional, but had been extensively modified and extended over the years and had become difficult to support.

PICK systems use closed data structures. As a result, the systems couldn't interface to modern technologies, such as spreadsheets, customer relationship management software or even the Web. Reports were paper or PDF-based; some online reports scrolled across a screen and couldn't be captured. New reports required up to two weeks of custom programming, diverting valuable IT resources away from other demands.

Long term, the company realized it had to move to a new, more flexible technology infrastructure. However, in the short term, management recognized that it needed to significantly improve its ability to generate quality, real-time reports for timely analysis of data. This would enable them to make more informed decisions and provide better client service.

To guide them, Consortium hired Integrated Knowledge Systems, a leading consultant that uses its Whole Systems Design approach to merge human performance, processes and technology to improve business results and performance. IKS recommended that Consortium begin by creating an enterprise architecture that reflected human as well as technological requirements, to ensure that technology was tied directly to business requirements and goals.

**The Solution: Springing into Action** Based on its Whole Design Methodology, IKS formed teams of internal experts. In group sessions these teams provided feedback on current processes and ways to improve the efficiency, effectiveness and quality of processes within the given area. They also described the roles people needed to play, and the communication requirements among different roles. System Architect was used by the IKS-Consortium team to capture the processes, data, and other information in written and graphical representations.

IKS began by tackling the daunting challenge of improving the management reporting infrastructure. The team focused on capturing "what" activities or actions. For example, what happens when an order is received? Activities include determining the final price, calculating the discount, finding its status (in stock or on back order), evaluating a customer's backorder policy (do they allow back orders), and determining the final invoice and shipping dates and costs. By focusing on "what" is done, rather than "how" it is done, IKS was able to clearly define the key aspects of essential processes and eliminate redundancies and inefficiencies. IKS was then able to assess how systems and data did – and should – support those processes.

The Consortium / IKS team designed models that encompassed all major activities of the business and the information needed to support those activities. The models included an *ACTION* architecture that captured communication, functions and processes; and a data architecture. The *ACTION* architecture was designed to help Consortium focus on which business processes were working and which weren't in key areas such as inventory management, fulfillment, order and return processing. Both *ACTION* and data architectures were used to define precise requirements for new software, database, and hardware systems. IKS chose Popkin's System Architect, a leading enterprise architecture and modeling tool, as the platform for creating the models.

"System Architect supports multiple methodologies, a key factor in this project where business processes must be tied directly back to their underlying technology," said Tom Goodell, President, IKS. "Our Whole Systems Design approach enables us to develop blueprints that accurately reflect what is required of people in terms of roles, accountabilities, and communication; and technology in terms of



information structures, interfaces, data distribution, reports, and so on. System Architect was the perfect tool for us because it can deliver that broad graphical view of how people, data and processes interrelate. With that view, our project teams can be much more effective in determining how to improve the way things are done, both from a human and a technological perspective.”

**Building a Data Warehouse** The team quickly recognized that there was an immediate need for vastly improved executive and management reporting. It was important to address that concern quickly, without waiting for all new systems across the organization. Their strategy was to develop a data warehouse in Microsoft SQL Server that could address those needs quickly in the existing environment, but that could also be adapted to any new system they purchased.

Creating the warehouse was a huge challenge, and System Architect was the ideal tool for addressing it. Since PICK is not a relational database, the team could not simply pull out the needed data. Instead, a System Architect driver was easily adapted to access PICK data structures. This enabled the team to reverse-engineer the physical data layout of PICK files into a data model in System Architect, so the team could identify the physical data structures needed in the data warehouse. First, inventory and order entry data, then financial data structures were mapped in System Architect. System Architect was then used to forward-engineer the data model into SQL Server. Using the System Architect models, IKS wrote a program that automatically moved data from PICK into the data warehouse each night. When the PICK systems were replaced, it was straightforward to use this same approach to move data from the new system into the data warehouse, thus allowing them to continue leveraging the investment in the data warehouse.

By merging the silos of PICK data into a single data warehouse, IKS was able to create timely, dynamic management reports that could be electronically generated and manipulated. Dot Net was used to create the web-based front-end to the reporting system, and Crystal Reports was used for the actual reports. A thorough analysis of Consortium’s reporting needs was performed, to ensure that the system would be flexible enough to address current and future reporting requirements without constantly developing new reports.

**ROI** The new management reporting system quickly produced a profound impact on the way Consortium operates. Reports that used to take two weeks to code can be created on the fly. Reports previously could only be generated after month end in hard copy; today they are available on demand and users can export or print the data. Depending on need, data in the reports may be up to the minute; no data is older than close of business on the previous day.

Client reporting has also undergone a transformation. Previously, PICK-generated reports were mailed in hard copy or emailed in PDF format after the close of each month. With the new technology, customers have instant web access to timely data about their orders, in a format that can be downloaded into Excel or printed out. Publishers can manipulate and analyze spreadsheet-based reports, enabling them to monitor sales and returns of their books, and to more accurately forecast reprint orders and future sales.

**Laying the Platform for the Future** As the data warehouse and reporting system took shape, IKS used the ACTION and data models to develop an RFP for Consortium’s enterprise systems. The RFP differs from traditional approaches in the detailed level of requirements that can be generated using the Whole Systems Design approach and System Architect.

“Using System Architect, we were able to generate an RFP that included very specific system requirements, including detailed requirements for the user interface; how and where data is needed to support interactions among people; lists of entities, attributes, tables, fields and relationships between tables; specific system functionalities; and more.” says Goodell. “This level of detail enabled us to quickly narrow down the vendors and helped Consortium select the solution that best met their current

**Popkin Software****System Architect, Version 10.0**

and projected needs. System Architect also played a key role in helping Consortium transition to the new technology.

“Consortium is now ahead of its peers,” continues Goodell. “The new technology foundation built using the Whole Systems Design methodology and System Architect has enabled the company to take its commitment to customer service to the next level and deliver high-quality information and responsive customer service to its customers so they can make better decisions.”

While streamlining business processes and updating technology has had a dramatic impact, IKS’ Whole System Design has also brought cultural change. Throughout the project, employees were taught new communication skills to improve their ability to perform their roles in the business processes, and in some cases coached on how to clearly communicate their needs for human as well as technological support to produce the desired business results. This approach led to a number of benefits that aren’t common in more traditional approaches to business process design. For example, the clarity of people’s requests to one another improved; the emotional content of some conversations became less of an issue; and technological requirements were more accurately understood and addressed in less time.

Consortium is committed to keeping its technology momentum moving forward. It continues to enhance its reporting capabilities as new needs arise, and with the systems they have put in place they are well positioned to manage significant growth and quickly address new opportunities as they arise.

## **15. Company Offices**

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## ProcessWizard

Version: 7.0

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## 1. Product Overview

ProcessWizard Ltd. is both a consulting company and a software vendor until recently the company was known as Mi Services Group, and the product was known as SCORWizard.) This double identity is apparent in ProcessWizard – a specialized tool that packages the company’s considerable consulting expertise in the form of an easy-to-use product featuring pre-built business process templates designed to help organizations define their business in term of supply chain management, customer relationship management, and product lifecycle management processes.

Table 1 provides an overview of ProcessWizard. In addition to its ease of use, ProcessWizard's strength comes from its preloaded business process templates covering:

- Supply Chain (SCOR) – for Supply Chain Management (SCM) projects
- Design Chain (DCOR) – for Product Lifecycle Management (PLM) projects
- Customer Chain (CCOR) – for Customer Relationship Management (CRM) projects
- Value Chain (VCOR) – for extended Value Chain projects

Alternatively, users can chose to work with ProcessWizard’s generic business process template (OCOR), which does not contain specific processes but still provides a hierarchical framework for rapid analysis.

ProcessWizard’s templates package strategy, architecture, design, metrics and measurement, and best practices. In this manner, ProcessWizard provides a design, analysis, and documentation platform upon which organizations can base the foundation of their business process management initiatives, thus saving considerable set-up time. (For a more detailed description of the business process domains supported by ProcessWizard’s business process frameworks, please refer to Section 8.)

ProcessWizard supports benchmarking, high-level measurement, and dashboard reporting. During any stage of a project, users can evaluate the state of their organization’s business practices against various best practices packaged with the product; the practices are accessible via simple drop-down menus. Users can also customize all metrics and best practices included with the product.

ProcessWizard has proved very popular with large organizations like the US Marine Corps and Exel Logistics because of the tool’s ease of use and because such organizations tend to perform a lot of business process analyses.

## 2. Product Architecture

### 2.1. Architecture Overview

ProcessWizard is available in stand-alone desktop or enterprise versions.

The desktop version allows users to create and save project files on their own desktop PC to a Microsoft Access database. The enterprise version allows users to access, share, and save project files to a server

running the Microsoft SQL Server database. Connections to SQL Server use ActiveX Data Objects (ADO) through native drivers or ODBC.

ProcessWizard can also be implemented within a hosted environment. Through the use of Microsoft Terminal Services and Citrix, a single implementation of the ProcessWizard Hosted version can be used as a global central repository for all business process projects. This service can be provided by ProcessWizard Ltd. or implemented within the customer’s own environment.

**Table 1—Overview of ProcessWizard Offerings**

ProcessWizard	Intuitive, easy-to-use tool featuring pre-built business process templates designed to help organizations define their business in terms of supply chain management, customer relationship management, and product lifecycle management processes. Features a large library of graphic notations, giving the user considerable flexibility when it comes to creating graphical process representations. Supports the <i>Supply Chain Excellence</i> methodology, as documented by Peter Bolstorff of SCE Limited. Available in desktop, enterprise, and fully hosted versions.
Pre-built Models & Templates	ProcessWizard is a framework-based tool. Thus, it derives a considerable amount of its functionality from its preloaded business process templates covering Supply Chain (SCOR) – for Supply Chain Management (SCM) projects; Design Chain (DCOR) – for Product Lifecycle Management (PLM) projects; Customer Chain; (CCOR) – for Customer Relationship Management (CRM) projects; Value Chain (VCOR) -- for extended Value Chain projects. In short, ProcessWizard automates in software the SCOR, DCOR, CCOR, and VCOR models.
Packaged Strategy & Metrics	ProcessWizard’s templates package strategy, architecture, design, metrics and measurement, and best practices.
Scorecards, Definition Matrixes, Opportunity Grids, Fishbone Analysis	ProcessWizard provides for benchmarking, high-level measurement and dashboard reporting. Users can evaluate their business practices against various best practices packaged with the product. <b>Balanced Scorecard</b> module allows users to compare company performance against internal or external benchmarks, and to identify performance gaps and to set targets. <b>Definition Matrix</b> allows users to define how many distinct strategic process flows their business has. <b>Opportunity Grid</b> allows users to translate and record their analyses into next-step project opportunities. <b>Cause &amp; Effect (Fishbone) Analysis</b> allows users to analyze and map process disconnects to their respective causes. Users can also customize all metrics and best practices.
Record & Model Locking for Team Development	The enterprise version of ProcessWizard supports multi-user functionality through a <i>Record Locking</i> function, and provides the ability to work on a project off-site by means of <i>Model Locking</i> features. Standard Microsoft Office version control is used to manage versions in ProcessWizard.
Report Generation	ProcessWizard will automatically generate an entire report based on the analysis captured within the model, making documentation time negligible.

**2.2. Usability and User Interface**

ProcessWizard provides a highly graphical and intuitive user interface. Users are therefore expected to have minimal technical skills. Typical users include business leaders, project managers, consultants, and business analysts.

ProcessWizard allows users to capture their analyses in pre-packaged and reusable business process improvement frameworks. It also provides a high level of reliability and predictability with respect to project duration, cost, and benefits.



ProcessWizard functions by allowing the user to define their business in terms of Supply Chains, Customer Chains, and Design Chains. For this purpose, it provides specific functionality designed to support a business process transformation project, including

- Process templates that can be easily defined (or modified), ensuring modeling consistency across the organization
- Customizable metrics for each business process framework
- A complete measurement system that is *tied* to strategy and processes
- A library of best practices that others have used to improve similar processes
- The ability for users to create *business process knowledge bases* that can continue to evolve with the business
- The ability to facilitate enterprise-wide adoption of business process management techniques
- The ability to capture employee experience, knowledge, and skills so intellectual capital does not disappear should key personnel leave
- The ability to clearly define technology solution needs based on the business’s strategic and operational requirements

The ProcessWizard work environment sports a typical Microsoft Windows or Office “look and feel.” A Wizard is provided to help users quickly start a new project. Creating organization charts, process, geographic diagrams, and other diagrams is done by pointing, clicking and selecting objects from a list of diagram types, while a Navigation Bar guides the user through each stage of the project. Creating a model consists of selecting the appropriate diagram/model type from a library supplied with the tool, and then entering company-specific information into the graphic. Double clicking on a process diagram brings the user down to the next level of the process, allowing her to further define the model. From defined models, ProcessWizard will automatically generate process flows. All of these features make the product very intuitive and very easy to use.

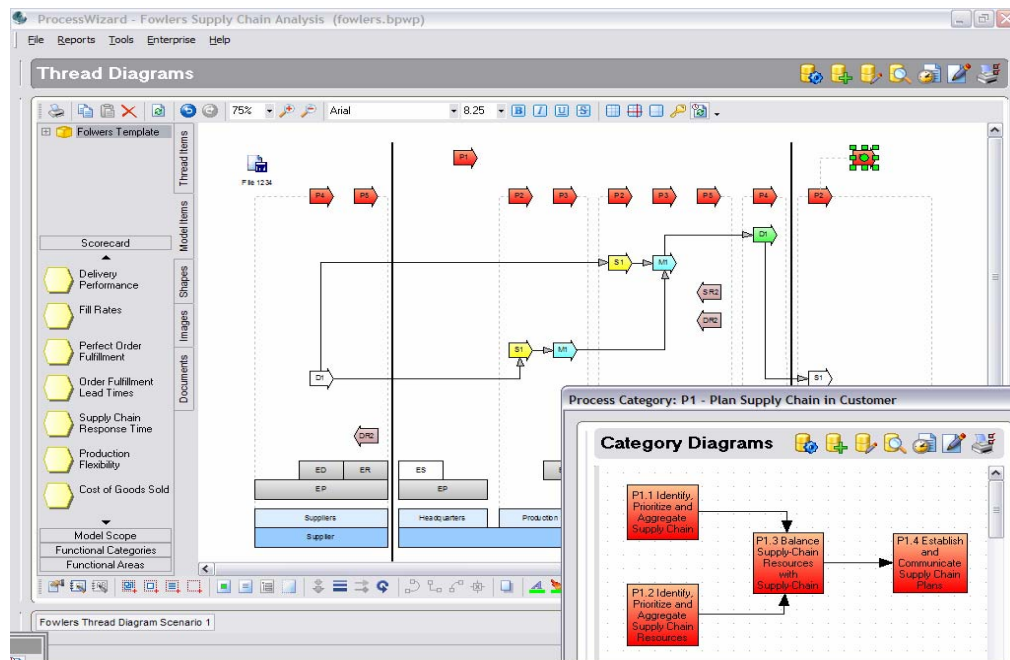


Figure 1. ProcessWizard GUI Displaying Thread and Category Diagrams

Figure 1 shows a ProcessWizard GUI. To the left is a Diagram Menu Bar. Clicking on this menu provides access to all the processes, metrics, best practices, and functional areas used throughout a model. To the right, ProcessWizard is seen displaying thread diagrams and category diagrams related to a supply-chain-planning model.

### **2.3. Repository Options/Team Development**

ProcessWizard is available in stand-alone desktop and enterprise versions.

The desktop version uses Microsoft Access for its database. The enterprise version uses Microsoft SQL Server (other databases are planned.) Connections to SQL Server database use ActiveX Data Objects (ADO) through native drivers or ODBC.

Models and reports created within ProcessWizard can be shared among users in several ways:

- By simply transferring the model/file electronically (i.e., via e-mail)
- By exporting model information to other applications
- By transferring model information to third-party tools (e.g., Microsoft Office, HTML editors, etc.) for publishing to the web or intranet
- Via centralized model storage and access control that provides record and model locking (check-out/check-in). For more on multi-user support, please refer to Section 9.

Company representatives say that the next planned release of ProcessWizard will provide web-publishing capabilities.

### **2.4. Integration with Other Products**

ProcessWizard integrates with other tools and applications via a COM-based model, which is available to integrate with the underlying data.

ProcessWizard does not provide a shared data space for the case of work.

Developers can move a ProcessWizard model to an external product either via one of ProcessWizard's supported export applications (e.g., Microsoft Office, etc.) or through customized integration.

ProcessWizard does not currently support XML.

## **3. Analysis and Process Modeling**

### **3.1. Defining Enterprise and Organization Models**

#### **Enterprise Architecture Models**

Although ProcessWizard draws from various Enterprise Architecture model sources, none have been included in the product in their entirety. However, ProcessWizard's packaged frameworks (SCOR, CCOR, DCOR, etc.) do allow users to define, model, and benchmark enterprise architectures.

#### **Organization Models**

ProcessWizard allows users to model organizational structures at various levels, including enterprise-wide, regional/divisional, departmental, individual, and so on. This is achieved through the use of various diagramming components embedded within the product, including:

Geographic diagrams -- allow the user to model high-level processes against a physical landscape (e.g., geographic map, factory floor, etc.)

Swim Lane diagrams – allow the user to map process flows against formal organizational structures (typically functional departments of a company)



RASCI diagrams -- allow the user to assign up to 5 levels of association to any process (and its constituent parts) in order to record who in the organization is involved in the process and their responsibility, i.e.,

- Who is **R**esponsible
- Who is **A**ccountable
- Who is **S**upporting
- Who is **C**onsulted
- Who is **I**nformed

**Resource and Cost Modeling**

ProcessWizard provides the user with the flexibility to define and model any type of resource class.

**Mapping Organization Strategies to Performance Measures**

ProcessWizard is a hierarchical modeling tool, thus making it easy for the user to map processes and performance measures to the overall strategy of the business. All ProcessWizard processes contain customizable metrics, leading practices, functional areas, and input/outputs.

At all levels within the product, processes and measures are aligned, thereby ensuring that the user defines the appropriate metrics for that process level. This is achieved through the creation of Balanced Scorecards or metric sets, which can be generated at any level within the model.

ProcessWizard's **Balanced Scorecard** module allows the user to compare company performance against internal or external benchmarks, and to identify performance gaps and to set targets. Figure 2 shows a ProcessWizard Balanced Scorecard screen measuring/benchmarking five areas of supply chain operations: delivery reliability, responsiveness, flexibility, costs, and asset management efficiency. The *Selected Metrics* screen allows users to select as well as customize metrics.

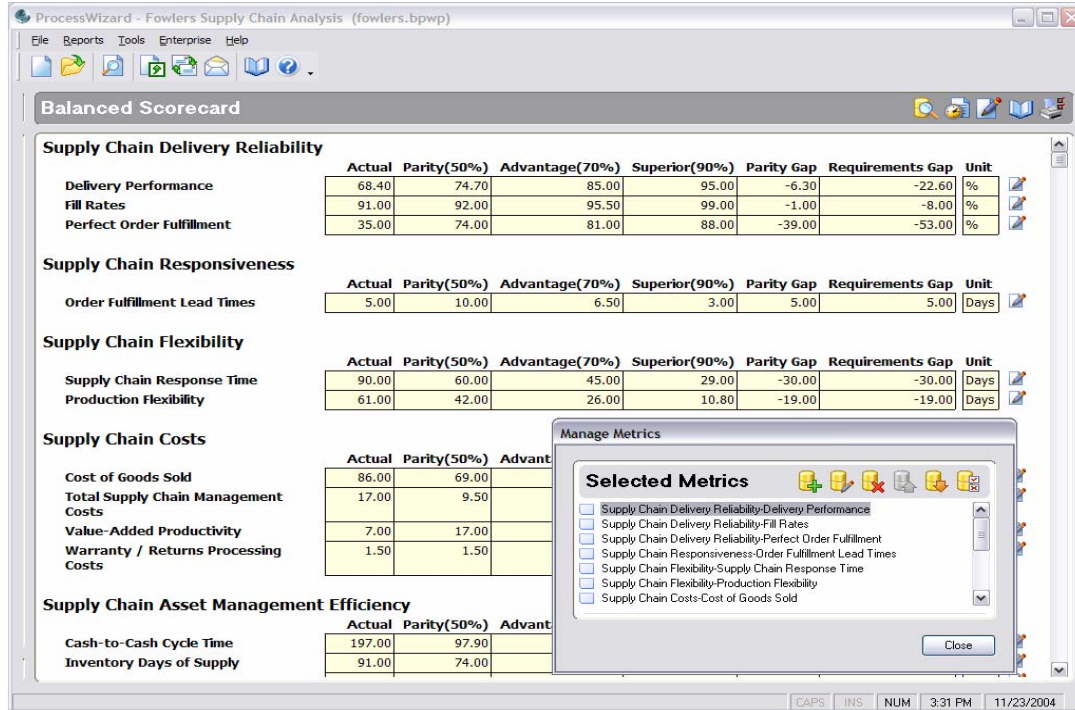


Figure 2. ProcessWizard Balanced Scorecard GUI with Selected Metrics.

Three additional modules within the product also support the mapping of strategy to processes:



**Definition Matrixes** -- allow users to define how many distinct strategic process flows their business has. For example, for a supply chain project, the user would map their company's major product groups to their markets/channels in order to define how many "supply chains" it has.

**Opportunity Grids** -- allow the user to translate and record their analyses into next-step project opportunities. This consists of the user defining and placing opportunities on the grid according to how easy or how difficult they are and how big or small the anticipated return.

**Cause & Effect ("Fishbone") Analysis** - allows the user to analyze and map process disconnects to their respective causes. The output is also presented in Pareto Charts in which each bar represents the relative contribution of each cause to the total problem, with the bars arranged in descending order of importance.

### **Managing Process Portfolios**

One of the distinct advantages of ProcessWizard is that the software comes pre-loaded with Business Process Frameworks already integrated into the tool. In addition to providing a quick way for organizations to jump-start their business performance management/enterprise architecture initiatives, ProcessWizard's packaged frameworks provide capabilities for structuring and managing process portfolios.

## **3.2. Defining Processes**

### **Defining Processes**

Users define processes by either selecting them from a library of approximately 200 predefined processes and subprocesses (sourced from the respective business process frameworks (e.g., SCOR, DCOR, CCOR, etc.), or by creating their own using ProcessWizard's *drag, drop, and connect* capability.

All processes contain customizable metrics, best practices, functional areas, and input/outputs. Users also have the capability to customize any process contained within ProcessWizard's library to better suit their needs.

### **Process Information Storage and Integrity**

Defined processes and their associated information are stored in a hierarchical structure. Thus, a typical process element has one *parent*, multiple *brothers and sisters*, and potentially many *children*.

Assigning a unique identifier to each process element created controls process integrity. ProcessWizard recognizes where in the process hierarchy the element is being created and assigns it a unique identifier based on its respective position in the model.

In addition to the unique process identifier and its description, the following additional information about each process element can be captured:

- Performance metrics
- Best practices (and detailed features)
- Inputs and outputs
- RASCI-based associations

### **Graphical Notations**

ProcessWizard comes with a large library of graphic notations, giving the user considerable flexibility when it comes to creating graphical process representations. Provided notations include

- 200 geographic maps
- 50 location icons
- 100 process shapes
- 30 Value Stream Mapping (VSM) images

In addition, should a user wish to use another notation, it can be imported and stored within ProcessWizard, as required.

ProcessWizard does not currently support BPMN. However, according to company representatives, the next version of ProcessWizard will support BPMN.

ProcessWizard does not currently support UML 2.0 Activity Diagrams. However, according to company representatives, the next version of ProcessWizard will support UML 2.0 Activity Diagrams.

### **3.3. Subprocesses and Activities**

#### **Handling Subprocesses and Activities**

ProcessWizard has the capability to handle and represent subprocesses. This is accomplished by double clicking on the selected process and creating the required subprocess below it. A unique identifier is assigned to each subprocess based on where in the process hierarchy the element is being created.

Basically, ProcessWizard does not have a limit with respect to the number or level of subprocesses that can be defined.

#### **Defining Activities**

Activities are defined in the same fashion as subprocesses (see above). Any resources used to perform an activity are captured and stored within the activity itself.

#### **Documenting Decision Rules**

ProcessWizard is currently *free form* with respect to documenting decision rules. Rules are captured and stored within the activity or decision point itself.

#### **Rules Entry**

Rules are defined and modeled within the process diagram via a dialog box.

#### **Activity Costs, Resources, and Time Data**

ProcessWizard allows any metric (e.g. time, cost, resource) to be defined, captured, and stored with any activity.

### **3.4. Simulation**

#### **Simulation Capabilities**

ProcessWizard does not currently feature simulation capabilities; however, according to company representatives, the next version will support simulation. In the interim, users can export data from ProcessWizard to third-party simulation environments. Simulated results can then be imported back into ProcessWizard as required.

#### **Analytic Capabilities**

ProcessWizard does not include a simulation component.

#### **Real-time Data Utilization**

ProcessWizard does not include a simulation component.

#### **Model Distribution and Simulation on Enterprise Networks**

ProcessWizard does not include a simulation component.

#### **Capture and Reporting of Simulated Metrics**

ProcessWizard does not include a simulation component.

## **4. Business Process Methodologies**

#### **4.1. Business Process Methodologies**

ProcessWizard is designed to support and fast-track business transformation projects. Consequently, it complements many process design methodologies. Specifically, it has been designed to support and complement the *Supply Chain Excellence* methodology, as documented by Peter Bolstorff of SCE Limited.

Supply Chain Excellence is a step-by-step guide through the business process project lifecycle. Supply Chain Excellence has recently been extended and subsequently renamed *Value Chain Excellence*. For more information on *Supply Chain/Value Chain Excellence*, visit [www.scelimited.com](http://www.scelimited.com).

ProcessWizard Ltd. and SCE Limited have integrated their respective offers (i.e., Value Chain Excellence and Process Wizard), thereby allowing them to market a comprehensive business process software package and consulting services offering.

ProcessWizard also supports the Balanced Scorecard methodology with scorecard creation capability available at all model levels.

#### **4.2. Six Sigma Support**

ProcessWizard supports Six Sigma initiatives in a number of ways:

- It contains Cause & Effect (“Fishbone”) Analysis with Pareto Chart output.

- It can be used to define processes that are very low in ”defects.”

- You can use it to identify projects that are typically tackled by Six Sigma trained personnel.

- It supports the DMAIC (define, measure, analyze, improve, control) Improvement Process when tackling projects.

### **5. Report Generation and Document Management**

ProcessWizard’s report generation capabilities are impressive. ProcessWizard will automatically generate an entire report based on the analysis captured within the model. Thus, documentation time is negligible.

Users have complete control over the report content by selecting areas to be included in the report. A report that compares and contrasts different models (e.g. “As Is” versus “To Be”) can also be automatically generated. Reports are either held within the product or can be exported in either RTF or PDF formats.

Reports are part of (and saved with) their associated project file. ProcessWizard project files can also be stored within any third-party document management system.

### **6. Development Environment**

#### **6.1. Language of Tool**

ProcessWizard was written using Microsoft Visual Basic for the framework and front-end navigation, with some routines in C++ for added efficiency. Common third-party libraries and controls have been included where appropriate. These include COM/DCOM, ADO (ActiveX Data Objects), and ODBC.

#### **6.2. Product Support, Maintenance, and New Versions**

ProcessWizard’s product support offerings include regular updates and new releases. New versions of the product are released at least once a quarter. A user *knowledge base* is also maintained and made available to all customers via the ProcessWizard Web site.

### **7. Software Modeling and Code Generation**

### **7.1. UML Model Generation**

The current version of ProcessWizard does not generate UML models for use by software developers.

### **7.2. BPEL Generation**

The current version of ProcessWizard does not generate BPEL.

## **8. Templates and Frameworks**

ProcessWizard is a framework-based tool that derives considerable functionality from its four business process frameworks:

- Supply Chain Operations Reference (SCOR) model
- Design Chain Operations Reference (DCOR) model
- Customer Chain Operations Reference (CCOR) model
- Value Chain Operations Reference (VCOR) model

These frameworks can either be used on a stand-alone basis or in combination. Together they provide complete process coverage across the extended value chain.

A generic hierarchical business process template, containing planning, execution and enabling processes, is also included.

#### **Supply Chain (SCOR)**

ProcessWizard automates in software the Supply Chain Council's Supply Chain Operations Reference (SCOR) model. The Supply Chain domain is defined as the collection of business activities associated with all phases of converting orders into deliveries. The Supply Chain distinguishes three process types – planning processes, execution processes, and enabling processes.

A planning element is a process that aligns expected resources to meet expected demand requirements. Planning processes balance aggregated demand across a consistent planning horizon. Planning processes generally occur at regular intervals and can contribute to supply-chain response time. Execution processes are triggered by planned or actual demand that changes the state of products. They include scheduling and sequencing; transforming materials and services; and moving product. Enabling processes prepare, maintain, and manage information or relationships upon which planning and execution processes rely.

#### **Design Chain (DCOR)**

ProcessWizard automates in software the Design Chain Operations Reference (DCOR) model. The Design Chain domain is defined as the collection of business activities associated with all phases of product engineering (research and development). The Design Chain distinguishes three process types – planning processes, execution processes, and enabling processes.

Planning processes prioritize design chain projects and allocate resources to design projects. Planning processes generally occur at regular intervals and can contribute to design-chain response time. Execution processes are triggered by planned or actual demand. Execution processes include decomposition of specifications; defining the form, fit, and function of products and services; creating and evaluating prototypes and pilots; and releasing products to supply chain execution, marketing, and services. Enabling processes prepare, maintain, and manage information or relationships upon which planning and execution processes rely.

#### **Customer Chain (CCOR)**

ProcessWizard automates in software the Customer Chain Operations Reference (CCOR) model. The Customer Chain domain is defined as the collection of business activities associated with all phases of

converting demand into orders. The Customer Chain distinguishes three process types – planning processes, execution processes, and enabling processes.

Planning processes balance aggregated demand across a consistent planning horizon. Planning processes generally occur at regular intervals and can contribute to Customer Chain response time. Execution processes are triggered by planned or actual events. Execution processes include customer visits; responding to customer inquiries; creation of customer solutions; and processing of claims and support calls. Enabling processes prepare, maintain, and manage information or relationships upon which planning and execution processes rely.

#### **Value Chain Operations Reference (VCOR)**

ProcessWizard automates in software the Value Chain Operations Reference (VCOR) model. A Value Chain describes very large-scale business processes that cover the full range of activities required to bring a product from its conception to its end use and beyond. This includes activities such as design, production, marketing, distribution, and support leading finally to the consumer. In effect, the Value Chain integrates (as subsets) the processes of Supply Chain (SCOR), Design Chain (DCOR), Customer Chain (CCOR), and Marketing Chain. The activities that comprise a value chain can be contained within a single firm, divided among different firms, contained within a single geographical location, or spread over wider areas. A Value Chain is also comprised of four dimensions, including strategy, product flow, workflow, and information flow. To be effective, a company must align all four dimensions in an improvement effort.

#### **Industry-Specific Templates**

In addition, ProcessWizard also owns a number of industry-specific ProcessWizard templates, for example, Chemicals, Pharmaceuticals, Aerospace, Defense and Retail. These templates capture the *intellectual capital* for that industry with respect to business processes, leading practices, and performance metrics.

## **9. Systems Administration and Security**

The enterprise version of ProcessWizard supports multi-user functionality through *Record Locking* functionality and provides the ability to work on a project off-site by means of *Project Locking* features.

**Multi-User Functionality with *Record Locking*.** The enterprise version of ProcessWizard allows users to create project files on their own machine and then save them to a central server running the Microsoft SQL Server database. When the project file is centrally stored, an infinite number of users can work on one project at the same time, safe in the knowledge that specific controls are in place, including

When a specific record (piece of data within the project) is being worked on, no other user can access it, but the rest of the project file remains available. For example, if a user is editing metrics for one process, then all other users are locked out of that specific area. However, another user can edit, for example, the best practices for the same process at the same time.

The record is unlocked/released when the user leaves that screen, allowing a new user to access and edit the information immediately afterwards.

An *override* function is also provided – e.g., if another user (with a higher authority level) needs to take control of a specific screen that is locked (a warning is provided first).

**Check-In/Check-Out Functionality (*Model Locking*).** This feature allows an individual user to take the master project file *offsite* to work on (e.g., for overnight work, etc.). In such a scenario, the software is either programmed to disallow access to all other users, or to simply provide a warning. In the latter case, other users can still access the project file but a warning is provided that the project model has been *checked out* that furnishes details of the check-out (i.e., by whom, date and time, etc.)



ProcessWizard provides various features and capabilities for administering and managing the work environment.

Standard Microsoft Office version control is used to manage versions in ProcessWizard. The administrator has ultimate control over file availability and sharing. In addition, key content of specific files can be *locked* by the administrator, thus ensuring crucial information is not overwritten or deleted by another user. Further user restrictions can also be applied to specific licenses as required.

ProcessWizard users are set-up and administered through the issuing of unique license key codes to individual users. While security is imposed on the process through the license key codes being tied to specific machines.

## 10. Scalability

**Vertically.** Users can either work in a *Desktop* (PC/Laptop-based) or *Enterprise* (server-based) network (or a combination of the two). Users within the network are added or changed simply by issuing new license keys. All network set-up and administration is managed remotely.

**Horizontally.** Models and reports created within ProcessWizard can be shared amongst users in a number of ways:

- By transferring the model/file electronically (i.e., via e-mail)
- Exporting model information into other desktop applications
- By transferring model information to third-party tools (e.g., MS Office, HTML editors, etc.) for publishing to the Web or intranet
- Via centralized model storage and access control (discussed in previous section)

## 11. Platforms

ProcessWizard runs on Windows 2000, 2000 Professional, XP and XP Professional, and 2003 Server platforms.

## 12. Pricing

ProcessWizard Ltd. pricing ranges from a single-user desktop version (\$3,000) to networked corporate licenses (e.g., 12-user system from \$19,750).

## 13. Company, Product Positioning, and Support

### 13.1. Company Background Information

ProcessWizard Ltd. is a recently formed company resulting from the reorganization of Mi Services Group -- an international business solutions company headquartered in the United Kingdom. ProcessWizard now operates as a separate legal entity -- a move designed to make it more responsive in its chosen markets and to deliver more value to its existing customers. A brief background on the company's history and ownership helps to put ProcessWizard Ltd. into perspective.

In 1984, Integrated Automation Systems (IAS) was founded as a software provider to various industry sectors. IAS became a wholly owned subsidiary of the engineering company Motherwell Bridge Holdings in 1992, and in September 1996, IAS and all other similarly aligned software subsidiaries were merged together under the Motherwell Information Systems Ltd. (MIS) umbrella.

In January 2000, Europe's leading venture capital company, 3i, backed an £84 million institutional buyout of MIS from its parent company, Motherwell Bridge Holdings. Following the buyout,

Motherwell Information Systems Ltd. changed its name to Mi Services Ltd., subsequently trading as Mi Services Group. Finally, in January 2005, ProcessWizard Ltd. was formed in order to place more focus on the ProcessWizard product and its customers.

The company has approximately 230 employees (business process development: 20; business process sales: 10; consulting: 180; support: 20). The company has about 400 customers and has sold approximately 3,000 units.

In 2004, Mi Services revenue was \$33 million (Consulting: 35%; Support: 15%; Product: 50%).

### **13.2. Positioning**

ProcessWizard can be used to support a variety of EA modeling and BP change activities, including Enterprise architecture modeling and analysis

- Process modeling and analysis, redesign, and improvement
- Human performance improvement initiatives
- Development of management and measurement systems

ProcessWizard's embedded business process frameworks enable users to develop rapidly a clear business process transformation roadmap for their organization. Thus, in essence, ProcessWizard is closer to an enterprise architecture tool than a regular process modeling tool, but it is part of the wave of the future if companies start relying heavily on business process frameworks like SCOR, DCOR, and so on.

ProcessWizard's library of graphic notations provides users with considerable flexibility when it comes to creating graphical process representations for process modeling and analysis, and redesign and improvement initiatives. Although ProcessWizard does not provide a simulation component, the best practices packaged with the product provide extensive capabilities for evaluating and measure the state of a company's business practices against internal and external benchmarks. ProcessWizard can also be used to support human performance improvement initiatives and the development of management and measurement systems through the use of its high-level measurement and management features (e.g., Balanced Scorecards, Definition Matrix, and Opportunity Grids).

Finally, although ProcessWizard does not really provide the ability to support IT and software development efforts (e.g., implementation of web services or service-oriented architectures, etc.), it does, however, support software application implementations (e.g., SAP, Oracle, etc.). In other words, ProcessWizard is useful for defining the process requirements that the business has, which then serves as the input for creating the implementation *blueprint*.

### **13.3. Product Training**

ProcessWizard Ltd. is as much a consulting company as a software vendor.

Consequently, the company provides a range of comprehensive service offerings, covering project-based consulting to product training and support. Company instructors are not just experts in ProcessWizard software; they also have a full comprehension of the built-in process frameworks and their application to real projects. In addition, training not only covers the features and functionality of the software; it also includes real-life examples of how customers have leveraged the software to maximize their return.

Training options are available either *on site* or at one of the company's own facilities.

### **13.4. Business Process Consulting**

ProcessWizard Ltd. is a business and an IT consultancy with particular expertise in the manufacturing and distribution sectors. The company provides a range of skills and solutions across four major segments of the market:

1.) Business Process Management:

- Business coaching
- Project management and business analysis
- Change management
- Process modeling and design

2.) Supply Chain Management:

- Strategic analysis and design
- Supply chain planning and execution
- Process analysis and modeling solutions
- Change management and project management

3.) Enterprise Resource Planning:

- End-to-end solutions development
- Consulting and implementation
- Support services
- Project and program management

4.) Enterprise Application Integration

- E-enabling ERP systems
- B2B solutions
- Application integration
- Software development

## 14. Case Study

Exel Logistics used the predecessor to ProcessWizard – SCORWizard – to slash the time and cost required to assess and define its customers' supply chains.

Exel is a leader in supply chain management, providing solutions to a wide range of manufacturing, retail and consumer industries. Exel's logistics solutions encompass the entire supply chain, ranging from design and consulting through freight forwarding, warehousing, and distribution services to integrated information management and e-commerce.

Exel is a long-time proponent of the Supply Chain Council's SCOR model, using its principles in supply chain process improvement and design across manufacturing, retail and consumer industries. However, there were a number of business challenges confronting Exel in its application of SCOR to implement customer solutions. For one, the 250-page SCOR manual is difficult and time consuming to apply. In addition, the time required to understand a customer's supply chain needs can be lengthy. Quantifying potential ROI for projects can also be difficult. Finally, Exel has had to keep its consulting teams lean in order to maximize value its customers.

The ProcessWizard Ltd. solution was to help Exel automate the implementation of the SCOR model, using SCORWizard, which basically provided Exel with a software application that could map a company's entire supply chain as well as assist in identifying areas for improvement. ProcessWizard Ltd. also assisted Exel with professional and practical product training and support. Both of these efforts translated into a solution that provided Exel with the following benefits and ROI:

- Time required to assess and define supply chains was reduced from 24 man-hours to four.

- Time required to quantify potential ROI for projects was reduced by 75%.

Phil Siewert, Director of Solutions Development for Chemical/Industrial Americas, Exel Logistics, says that the SCOR manual totals a hefty 250 pages; poring through it to access and apply the knowledge it contains is a time consuming process. Using SCORWizard to automate the process of applying SCOR to a business results in more rapid insights for Exel's customers. He added: "We use SCOR and SCORWizard because it contains standard intellectual property, industry best practices and is a validation tool for our own experience and methodology."

"We use a four-step process of engagement with our customers, going through Define, Design, Detail, and Deliver phases," he said. "SCORWizard is of particular value in speeding up the *Define* step, which is where we find out customer needs by modeling the dynamics of their entire supply chain. The *Define* step is critical because it enables pragmatic decisions about which areas to focus on, and quantifies potential ROI for projects before starting them. SCORWizard has cut the time required to complete this step from 24 man hours to just four."

SCORWizard is also valuable in the *Design* step, which involves complex analyses. Siewert says that SCORWizard is much more intuitive to use than other tools he evaluated, training taking only about three days. "The training from ProcessWizard was of an extremely high standard. Even after the first day, staff were successfully using what they had learned," he said.

Exel also uses SCORWizard internally to analyze its own service supply chain. In addition, the company uses SCORWizard for a number of internal process workshops. As a result, it has become a very popular tool with the company's operations community as a means of looking at and dealing with improvements.

Phil Siewert states: "We use SCOR and SCORWizard because it contains standard intellectual property, industry best practices, and is a validation tool for our own experience and methodology."

Having realized success with SCORWizard, Exel plans to upgrade to ProcessWizard (the successor to SCORWizard), which contains all the functionality of SCORWizard while adding additional functionality to support Design Chain (PLM) and CRM.

## 15. Company Offices

ProcessWizard Ltd. is represented by regional offices in Europe, North America, and Asia-Pacific. Through a combination of its own resources, complemented by a network of carefully selected business partners, the company maintains a global sales, delivery, and support capability for ProcessWizard. For a list of partners see the company website: [www.process-wizard.com](http://www.process-wizard.com)

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# ProVision

Version: 4.4

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### 1. Product Overview

ProVision is a leading modeling tool that is quite popular among business managers because it combines sophisticated modeling capabilities with an easy-to-use interface designed for business users. Table 1 provides an overview of ProVision Suite.

ProVision is a comprehensive product consisting of the following modules:

- **ProVision Process** – a limited version designed for helping managers document and redesign processes.
- **ProVision Enterprise** – a high-end version (of ProVision Process) with comprehensive capabilities and features that support enterprise strategy, process analysis, and software development efforts.

ProVision Enterprise is basically a superset of ProVision Process. The main differences between the two products are the number of models each can build – ProVision Process can build 4 kinds of models, ProVision Enterprise can build 20 – and their price. Otherwise, both share the same repository and other features discussed in this report.

ProVision Enterprise contains a large number of integrated strategy, process, and system modelers, along with model interpreters, Monte Carlo and Discrete Event simulation, web-enabled publishing facilities, spelling/completeness checker, and model comparison facility. With the purchase of additional modules, ProVision Enterprise can support team development via the Internet (based on a shared data repository). BPEL interface module is also available that supports the generation of code for web services from process definitions created in ProVision.

ProVision Enterprise supports a large number of frameworks. Special templates and models are also available for jump-starting ITIL, supply chain, telecom, insurance, higher education, and Sarbanes-Oxley efforts.

**Table 1. Overview of ProVision Suite.**

ProVision Process	A limited version designed for helping managers document and redesign processes.
ProVision Enterprise	High-end version (of ProVision Process) with comprehensive capabilities and features that support enterprise strategy, process analysis, and software development. Provides Monte Carlo and Discrete Event simulation capabilities.
TeamWork	Supports team development, allowing authorized users to share the analysis and design of a process by allowing them to check-in/check-out parts of the process from the repository when they want to work on them and check them back in.
ProServer	Multi-user, remote access server that supports (repository-based) team development (i.e., check-in/check-out, versioning, etc.), allowing users to store and manage business models and objects remotely via the Internet.
WebVision	Facility that translates ProVision models into HTML, allowing users to access them (read only) via any PC with a Web browser.





ProGuide	Proforma's proprietary business process analysis and redesign methodology, used by Proforma consultants, is described as a set of models.
Pre-built Models and Templates	Telecom, Higher Education, Insurance, SCOR, Sarbanes-Oxley, and ITIM
Rose Exchange	Allows developers to import or export UML Use Cases and Class diagrams between ProVision Enterprise and IBM Rational Rose.
ERwin Exchange	Allows developers to import or export Class Diagrams and Entity Relationship diagrams between ProVision Enterprise and the ERwin database design tool.
Visio Exchange	Allows developers to import drawings from Visio.
MS Project Exchange	Allows developers to export workflow models from ProVision to Microsoft Project.
BPEL Interface	Supports generation of code for WebServices from process definitions created in ProVision.
ProVision Database Option	Lets users store the ProVision repository on Microsoft SQL Server or Oracle databases.

## 2. Product Architecture

### 2.1. Architecture Overview

Figure 1 provides an overview of the ProVision (ProVision Enterprise) architecture. ProVision offers graphical diagramming and modeling tools tightly coupled with a repository and meta-model of business process elements. As shown, ProVision supports both relational and object-oriented data stores, and provides standard APIs for integrating ProVision with a range of third-party tools. ProVision is available in desktop and client-server versions, which support multi-user, remote access to ProVision models and objects via internet or intranet, while relying on a shared repository.

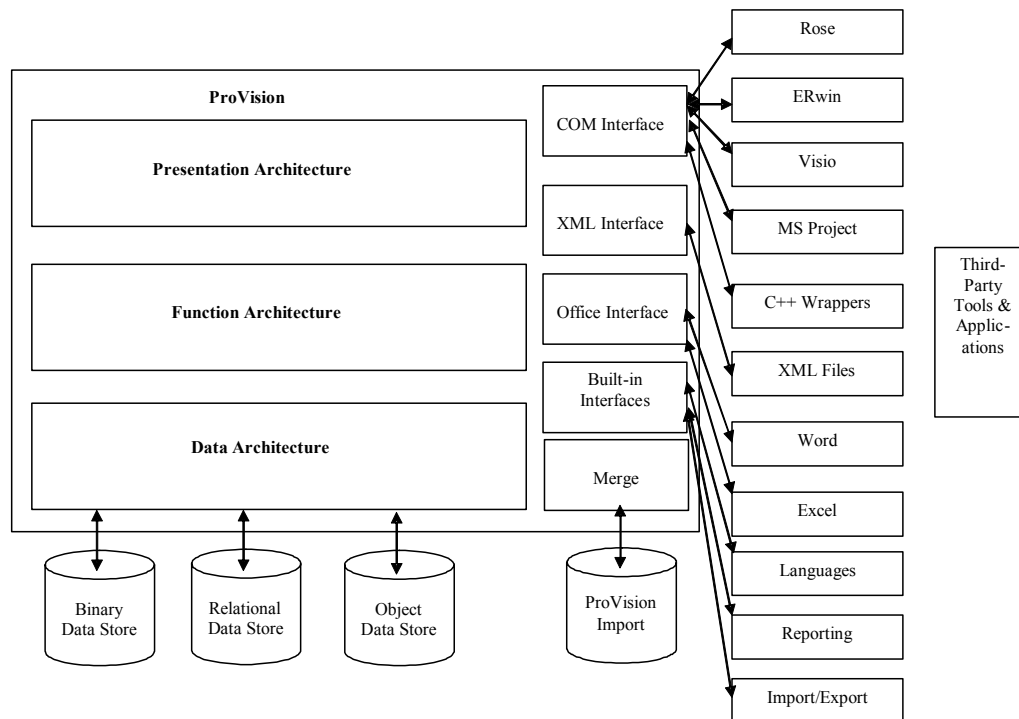


Figure 1. Overview of ProVision Enterprise architecture.

2.2. Usability and User Interface

ProVision is designed to support the general business user (i.e., manager) as well as the more technical analyst. In addition to providing a very friendly portal-like UI for managing, maintaining, and navigating models and data within the tool's various functions and context-sensitive help, ProVision features intuitive modeling facilities based on the Microsoft Office paradigm.

ProVision offers a choice of user interfaces. One is an HTML-like portal that presents users with an *architectural* interface to ProVision's various modeling tools. As shown in Figure 2, this interface divides ProVision's diagramming facilities into six perspectives: What, Where, Who, How, When, and Why.

By clicking on one of these balls, the user is taken to all the information pertaining to that particular perspective.

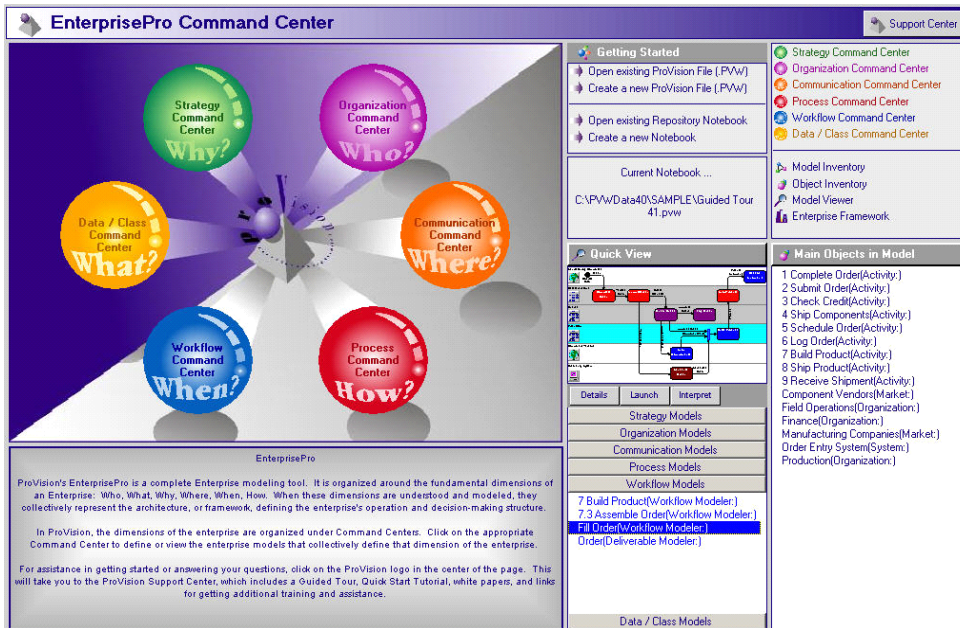


Figure 2. ProVision Portal Interface.

Figure 3 shows another user interface option. Here, the six categories are displayed as columns, and the models supported by each perspective are shown as bars. The figures at the top refer to specific models (highlighted in various colors), made with specific modeling tools. Users can use this interface to search through diagrams, and then, when one finds the small diagram one is looking for, may click to enlarge it.

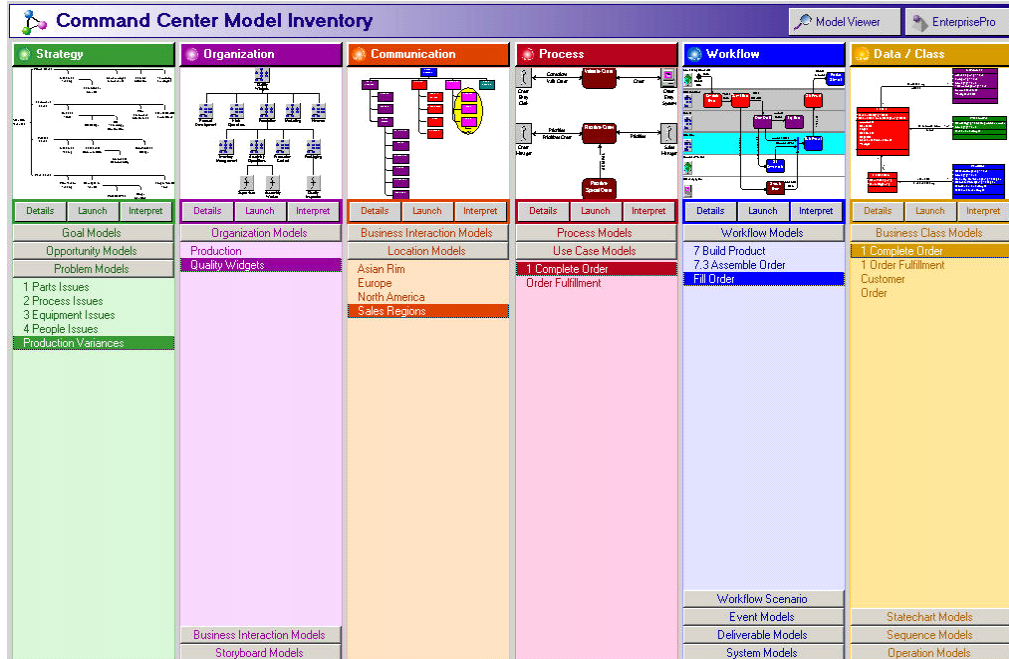


Figure 3. ProVision Command Center Model Inventory interface.

For documenting processes, the ProVision interface uses the *swim lane* paradigm for its workflow model, as shown in Figure 4.

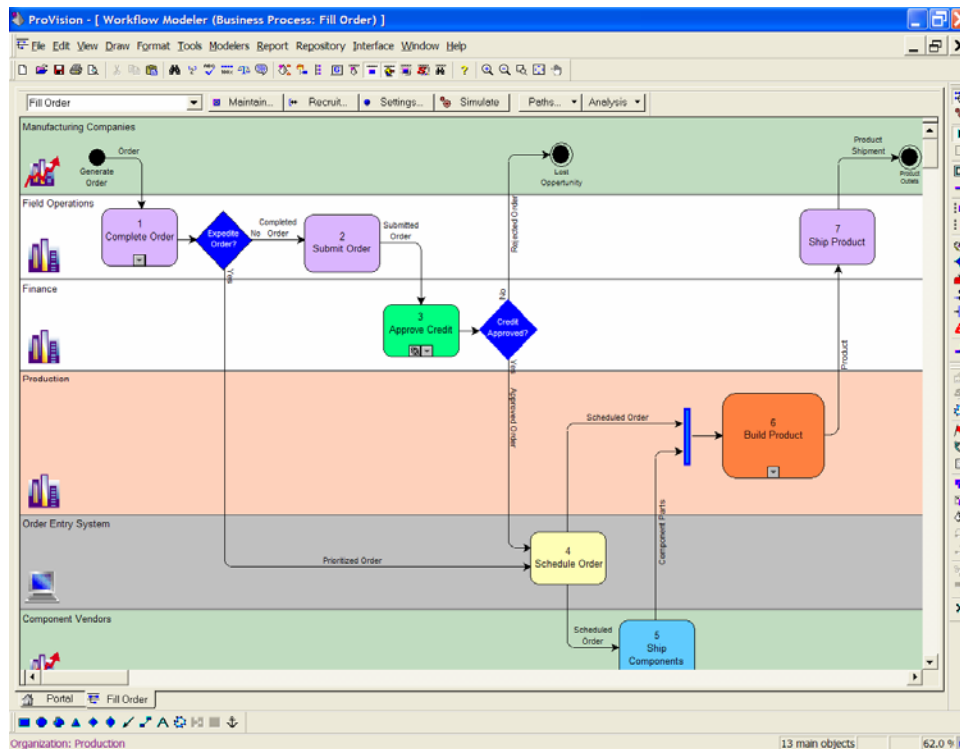


Figure 4. ProVision Workflow Model.

ProVision also provides an interpreter for translating models into simple English at the click of a button, the ability to build models from Word or Excel programs, and capabilities for publishing diagrams to

Word or HTML. Finally, users can take advantage of ProVision's *instant* email feature for sending models to other ProVision users.

ProVision also features customizable toolbars and menus, making navigation and ease of use more intuitive. It also utilizes pre-built reports and user-friendly report generation interfaces, which help to reduce the amount of training needed.

ProVision highlights include:

- Interpreter that provides an instant textual report of a model's graphical components.
- Ability to publish graphical models and their textual representations to HTML or Word.
- Completeness and spellchecking features for ensuring model integrity. Completeness check analyzes models for Orphans, Unused objects, Hidden objects, Component objects, Missing descriptions, Missing properties, Missing custom properties, and Incomplete links.

### **2.3. Repository Options/Team Development**

ProVision supports repository-based team development with the use of the TeamWork and ProServer add-on modules. TeamWork allows authorized users to share the analysis and design of a process by enabling them to check-out/check-in parts of a process from the ProVision repository. ProServer is a multi-user, remote access server that supports (repository-based) team development (i.e., check-in/check-out, versioning, etc.), allowing users to store and manage business models and objects remotely across the web. Models are accessed and modified with a ProVision client, utilizing ProServer's centralized database with (check-in/check-out) procedures.

ProServer is written in Java. It can run on any platform that supports Java and Java servlets. ProServer supports large volumes of information, as well as concurrent access by multiple users. ProServer requires the use of Proforma's database option, which lets users store the ProVision repository on more scalable Microsoft SQL Server or Oracle databases. The standard practice is to store the ProVision repository on the Microsoft Jet engine (the database manager for the Access database), due to its small footprint, fast performance, and because it requires no additional cost.

### **2.4. Integration with Other Products**

ProVision offers several capabilities for integrating third-party tools and applications, including

- Bi-directional interface with ERwin, Rational Rose, and Together Soft
- Ability to import/export data via XML, XMI, BPEL4WS, MS Project and Visio
- Ability to import/export data from Excel, MS Access, CSV, text or tabular file formats

Users can also be developing new data exchange modules using ProVision's COM-based (Component Object Model) API.

## **3. Analysis and Process Modeling**

### **3.1. Enterprise and Organization Models**

#### **Enterprise Architecture Models**

ProVision supports various enterprise architecture modeling conventions, including Zachman, TOGAF, Enterprise Architecture, Information Engineering, DoDAF, DoD/C4ISR, Rummler-Brache, and UML. ProVision also provides facilities that allow organizations to tailor models to support their specific needs by defining additional objects, links, and properties.

In addition, ProVision also offers ProGuide, a (proprietary) best practices guide for application development, software package selection, and process improvement, analysis, and design. (ProGuide is discussed further in Section 4.)

### **Organization Models**

ProVision provides capabilities to create hierarchically structured organizational models. These models graphically depict how organizations report to other organizations and how specific roles report to organizations. ProVision relates processes to organizational units through the use of swim lanes in a workflow model. Swim lanes graphically depict who is responsible for the work. Responsibility may fall on an organization, a system, or even on a specifically defined role.

### **Resource and Cost Modeling**

ProVision allows end-users to capture information and data related to resources in the form of objects. Resource objects can include Organizations, Roles, People, Equipment, Facilities, Systems, Stores, and Custom objects

Resources can be defined with specific costs and schedules of availability. They can be associated with goals, opportunities, organizations, and even risks.

### **Mapping Organization Strategies to Performance Measures**

ProVision provides the capability to map performance strategies and goals directly to a process activity in the form of an association. Associations help define the traceability of relationships. Examples include Goals to Activities, and Systems to Roles.

ProVision can create user-defined association grids that are used to both map and modify strategic relationships.

### **Managing Process Portfolios**

ProVision's underlying database repository is partitioned with notebooks (i.e., portfolios). The repository and notebooks are easily managed using the ProVision Portal interface, which allows the management and maintenance of models and objects created within ProVision.

## **3.2. Defining Processes**

### **Define Processes**

ProVision defines a process as an end-to-end business visualization designed to graphically depict the responsibility of work in relation to the actions of an organization, automated system, or even a specific role. Users can define a process starting from the top of a parent process level and modeling down from the top or up from the bottom.

### **Processes Information Storage and Integrity**

ProVision provides model/process consistency through its pre-defined modeling languages that provide the rigor for an organization's methodology through model and object behavior and style controls. And, as described in Section 2.2, ProVision also offers completeness and spell checking features to ensure model integrity.

### **Graphical Notations**

ProVision supports a range of pre-defined graphical notations, including ProGuide (proprietary), Information Engineering, DoDAF, DoD/C4ISR, Rummler-Brache, and UML. ProVision also provides the ability to import custom graphic notations, and to create custom objects and properties.

Regardless of the notation used, data from multiple diagrams that represent different perspectives of the same concept are stored as a single object, assuring that any information associated with a specific activity on one diagram is available when that same activity is used in any other diagram.



ProVision's workflow model currently supports BPMN at approximately the 85-90% level. Company representatives stress that the next release of ProVision will provide complete notational support.

ProVision defines and integrates process-to-data requirements via UML class and system models. ProVision also provides a clear definition of system requirements via UML Use Case and storyboard models. In addition to offering bi-directional interfaces for ERwin, Rational Rose, and Together Soft, ProVision provides import/export support for the following UML models via XML: Business Class, Package, Workflow, Use Case, Sequence, State, and Subtype.

### **3.3.SubProcesses and Activities**

#### **Handling Subprocesses and Activities**

ProVision can represent subprocesses in the form of models nested beneath activities and objects. Nested models provide the ability to drill down from the parent level and view a more granular visualization of a process. ProVision provides the ability to drill down to an infinite number of levels, and process models can be defined from the top parent level down or from the bottom up.

#### **Defining Activities**

Activities in ProVision are used to graphically depict the sequence of actions or events in a process and show the responsibility of work in relation to an organization, automated system, or even a specific role. Users can define activities and events in a process starting from the top parent level down or from the bottom up.

#### **Documenting Decision Rules**

Decision rules are documented as a graphical notation offering a choice between alternate paths in a process. Decision rules utilize discriminators offering mathematical probabilities to determine the alternate paths in a process.

#### **Rules Entry**

Users enter decision rules through a dialog box that provides the ability to define a rule and customize its individual properties.

#### **Activity Costs, Resources, and Time Data**

ProVision allows each activity in a process to contain its own cost, timing, and resource information. This information is tied directly to each activity, and can be used for simulation purposes to approximate the actual operation of a scenario, and for predictive analysis.

### **3.4.Simulation**

#### **Simulation Capabilities**

AnalyzerPlus is included with ProVision. It supports Monte Carlo and Discrete Event simulations.

#### **Analytic Capabilities**

AnalyzerPlus's simulation engine lets users define business case scenarios and perform process simulation and animation with cost, timing, and resource analysis for workflow models. Users can approximate the actual operation of a scenario and provide predictive analysis. During simulation, cost, timing, and resource utilization information is accumulated by each activity and rolled up through multiple levels of a process (i.e., through each level) and attributed to a specific scenario. A pre-defined analysis is then generated with components, including

- Activity State Grids
- Commodity State Grids
- Cost Distributions
- Cost Grid Entities
- State Grids
- Resource State Grids



- Staffing Grids
- Timing Grids
- Resource Utilization Grids

Each process can contain multiple processing scenarios, allowing an unlimited number of *what if* analyses. Users can perform different *what if* analyses by varying resource allocation, commodity inventories, and replenishment levels. Simulation results can be displayed and analyzed in cost and timing spreadsheets and graphs. Additionally, users can export information contained within the above-mentioned reporting formats directly to Excel for additional analysis.

#### **Real-time Data Utilization**

ProVision can accept real-time data through the use of import/export capabilities derived from

- Bi-directional interfaces with ERwin, Rational Rose, and Together Soft
- Ability to import/export data via XML, XMI, BPEL4WS
- Import/export from Excel, Access, CSV, text or tabular file formats
- COM API

ProVision's simulation engine may be accessed independently via a COM API.

#### **Model Distribution and Simulation on Enterprise Networks**

The ProServer and WebVision modules allow ProVision to distribute models and simulations across a network. ProServer provides object and model level locking, enabling users to share, manage, and modify models via a ProVision client utilizing ProServer's centralized database with check-in/check-out procedures. The WebVision publishing tool provides access to ProVision business models and documentation via a repository residing on an internet or intranet server. (WebVision provides a read only static view of models, objects, and documentation via a standard internet browser.)

#### **Statistical Fit/Data Analysis**

ProVision currently offers a pre-defined analysis of the data captured during simulation. Simulation utilizes activity based costing (ABC) and allows users to approximate the actual operation of a scenario and provide predictive analysis. For additional analysis, users can export information and data captured during simulation to Excel and statistical analysis packages such as Jump and MINITAB.

#### **Capturing and Reporting of Simulated Metrics**

Currently, the analytic reports generated within ProVision are pre-defined, but ProVision does provide the capability to import/export data via XML, XMI, BPEL4WS, MS Project, and Visio. ProVision also provides the ability to import/export from Excel, Access, CSV, text, or tabular file formats.

## **4. Business Process Methodologies**

### **4.1. Business Process Methodologies**

ProVision comes standard with the Rummler-Brache methodology, which supports process analysis and redesign. ProVision also offers ProGuide, Proforma's proprietary best practices guide for process improvement, analysis, and design approaches.

ProGuide is a set of ProVision models that document the methodology used by Proforma consultants when gathering requirements for application development or software package selection, and when looking for ways to improve an existing process. ProGuide lays out Proforma's methodology in a series of workflow models and process hierarchies. It includes tips and techniques. It is useful for organizations that are building their own groups to specialize in process modeling. Organizations can also tailor ProGuide to reflect methodologies they are already using.

## 4.2. Six Sigma Support

Proforma offers a model driven Six Sigma solution that uses a combination of business modeling and statistical analysis to improve business processes. This approach uses ProVision for modeling the business components of the DMAIC method: Define, Measure, Analyze, Improve, and Control.

## 5. Report Generation and Document Management

ProVision offers several options for report generation, including the ability to publish/deploy graphical models and their textual representations produced from the Interpreter to HTML or Word. The interpreter provides a narrative description of models' graphical components. Users can also import/export model data to XML, Excel, and Access for custom reporting.

ProVision provides the capability to create publishing lists containing selected models and their interpretation for publishing to Word or HTML. It also offers the ability to attach additional documentation to activities and objects via an artifact (hyperlink). Attached documentation can include, but are not limited to, Word documents, Excel spreadsheets, PDF files, and URLs.

ProVision features automatic publishing facilities to produce high-quality Office-style documentation. This includes an auto-layout function, a drawing palette, and gallery so basic models can be customized, and *print preview*. ProVision uses standard Windows drivers, so models can be printed on any device that supports Windows.

## 6. Development Environment

### 6.1. Language of Tool

ProVision is written in C++ and C. ProVision offers bi-directional interfaces with ERwin, Rational Rose, and Together Soft and provides the ability to import/export data via XML, XMI, and BPEL4WS. ProVision also provides the ability to import/export from Excel, MS Access, CSV, text, or Tabular file formats, and offers an Open API Com.

### 6.2. Product Support, Maintenance, and New Versions

On average, major new ProVision releases occur every 9-12 months. New releases typically include enhancements based on customer feedback and the product direction established by the Proforma product management team.

Proforma releases maintenance product updates every six to eight weeks. Reported bugs and suggestions are queued up during that time period. They are reviewed, prioritized, fixed, and released, based upon their severity, and made available via online download.

## 7. Software Modeling and Code Generation

ProVision is designed to interface with popular authoring environments via bid-directional interfaces used to exchange conceptual and logical models (developed in ProVision), and to extract design information from other tools and automatically update the design models in the ProVision repository. ProVision interfaces with ERwin, Rational Rose, and Together Soft. It can also import/export data via XML, XMI, and BPEL4WS.

### 7.1. UML Model Generation

Developers can use UML diagrams created in ProVision to create skeletal C++ code. Developers can also move UML diagrams created in ProVision to IBM Rational Rose using the additional ROSE

exchange module. The same goes for Entity-Relationship diagrams created in ProVision; they can be moved to ERwin via an available bridge.

### **7.2. BPEL Generation**

The ProVision BPEL interface will generate code for executing business processes. Users can use the BPEL interface to automatically infer control structures and generate BPEL code from their process definitions (created in ProVision).

## **8. Templates and Frameworks**

Proforma offers six horizontal or vertical industry templates or frameworks for use with ProVision. It also offers several options that include domain-specific knowledge and rules available as add-on products.

### **Telecom Models**

Proforma's telecom models are based on the TeleManagement Forum's eTOM models. In addition to representing the three highest layers of functionality performed by most telecom companies, Telecom models have been extended with additional detail gained from the Proforma consultant's own experience working on client projects.

### **Higher Education Models**

These models implement knowledge of common higher education processes. Like the Telecom Models, they can be used as starting points for developing more detailed analyses of specific problems or as templates for process improvement.

### **Insurance Industry Models**

Insurance Industry Models consists of a set of standard business models that provide an enterprise-wide view of the insurance operations processes – Life, Health, Disability, Property/Casualty, Reinsurance, and Surety Insurance Practices. They are designed to function as a resource to assist insurance companies in developing accurate models of the information and the activities required to provide exceptional products and service to clients and partners.

### **ProSCOR**

ProSCOR is a set of models and an associated database implementing the Supply Chain Council's (SCC) SCOR framework. It is available to SCC-member organizations. ProSCOR models show how different types of supply chains operate. Companies can modify ProSCOR models to reflect their own supply chain operations (or planned operations) to support process improvement.

### **Sarbanes-Oxley Pro**

Sarbanes-Oxley Pro is a set of pre-built financial process and control models for corporate Sarbanes-Oxley initiatives. It features models for six core transaction processes and their associated internal controls – cash disbursements, cash receipts, payroll, purchasing, inventory, and revenue. It also includes a generic financial reporting model based on best practices in financial reporting.

### **Information Technology Infrastructure Models (ITIM)**

ITIM Framework provides IT organizations with a strategic perspective for how they accomplish their activities. For the core of this framework, Proforma used ITIL best practice and process material licensed from the Office of Government Commerce. From this core, they created a more strategic focus by introducing strategic objectives and risks. Operational metrics to enhance the ongoing management of processes were also added.

## 9. Systems Administration and Security

Administration and security functions are provided by the TeamWork and ProServer modules (see Section 2.3 for more on these modules), which enable object and model level locking. TeamWork can access and extend models via check-in/check-out procedures to maintain data integrity over a LAN. ProServer lets users manage and maintain business models and objects remotely across the web via a more scalable Microsoft SQL or Oracle server database.

ProVision tracks model revisions (versions) on a per model basis. Combined with ProServer or TeamWork, ProVision provides automatic version control for all project notebooks. Users can concurrently browse and check-in/check-out models for modifications. ProVision also maintains a history file for single- or multi-user repositories. For multi-user repositories, administrators can perform an audit from the history file to see what changes have been made, by whom and when.

Security is enforced utilizing TeamWork, which provides the ability to limit tool access/functionality based on user groups consisting of

- Administrators (repository management)
- Developers (read/write)
- Browsers (read only)

ProVision also provides simulation capabilities to both simple and complex processes. Simulation utilizes ABC and allows users to approximate the actual operation of a scenario and provide predictive analysis. During simulation, cost, timing, and resource utilization, information is accumulated by each activity and rolled up through multiple levels of a process. A pre-defined analysis is then generated, reviewed, and can be exported to Excel for additional analysis.

## 10. Scalability

ProVision Enterprise (client) currently supports Windows XP, Windows 2000, and Windows NT 4.0. ProServer (server) can run on Windows 2003 or 2000.

ProVision's underlying database repository is the Microsoft Jet Engine. Proforma offers true web-enabled repository sharing over a WQAN or LAN with its ProServer solution which makes it highly scalable. This can be implemented using a Microsoft SQL or Oracle database server.

## 11. Platforms

ProVision Enterprise (client) currently supports Windows XP, Windows 2000, and Windows NT 4.0. ProServer (server) can run on Windows 2003 or 2000.

ProVision's underlying database repository is the Microsoft Jet Engine. Proforma offers a more scalable solution, using ProServer, which can be implemented using a Microsoft SQL or Oracle database server.

## 12. Pricing

A single user license of ProVision Enterprise is \$4,500 per seat + 15% maintenance. A typical small team configuration (up to 20 users) would be accommodated by a 5-user "floating license" at a cost of \$45,000 + 15% maintenance. Typically, 4 users can be accommodated per floating license, so a 10-user floating license would easily accommodate 32 users at a cost of \$80,000 + 15% maintenance.

Consulting services are not required with the purchase of a ProVision license. However, consulting services can be requested at rates that vary, depending upon the services requested and the duration of the engagement.

## **13. Company, Product Positioning, and Support**

### **13.1. Company Background Information**

Proforma Corporation was founded in 1994. It is privately held, with more than 70 employees. Proforma has distributors in Europe, Japan, Canada, Brazil, and Australia, and has key technology alliances and partnerships with BPMI, OMG, SCC, and the TeleManagement Forum. Corporate partners include Deloitte Touche Tohmatsu, EDS, IBM, Oracle, and Unisys.

Proforma has more than 9,000 customers. To date, it has sold over 4,900 ProVision licenses worldwide. Proforma reported revenues of US \$10 million in 2004.

### **13.2. Positioning**

Proforma has positioned ProVision to support a range of EA modeling and BP change activities, including

- Enterprise architecture modeling and analysis
- Process modeling and analysis, redesign, and improvement
- IT/software development/automation activities
- Human performance improvement initiatives
- Development of management and measurement systems
- Detailed process modeling and analysis (simulation)

ProVision has emerged as one of the most feature-rich, general-purpose EA and BP modeling and analysis tool available. ProVision is also well positioned because of its highly friendly end-user interface that makes it especially appealing to business managers and analysts. In addition, Proforma's tools are well established with large organizations: General Motors has standardized on ProVision, and ProVision is widely used at both American Express and Hewlett-Packard, with the latter having used it extensively after its merger with Compaq.

### **13.3. Product Training**

In addition to offering courses in ProVision training, Proforma offers courses in Business Process Modeling and Simulation and Business Requirements with UML. Each course is designed to teach business specialists, business analysts, IT professionals, and project managers how to model, improve, and automate the business. In addition to Proforma's public course offerings, it offers private on-site classes and management seminars.

### **13.4. Business Process Consulting**

Proforma's consultants work with companies in virtually every field – from manufacturing to financial services, telecommunications to education, retail to government, energy to health care – to model, analyze, and improve their business processes and automated systems. Facilitated workshops are also available to help ensure that key people (senior management, process owners, information technologists, etc.) are involved in the analysis and decision-making.

## **14. Case Study**

American Express Company is a diversified, worldwide travel, financial, and network services company. It is a world leader in charge and credit cards, Travelers Cheques, travel, financial planning, business services, insurance, and international banking.

The Business Modeling Group (BMG) at American Express supports the business process modeling needs of the company's 73,000 business and technology partners around the world.

After being introduced to ProVision by IBM and implementing a rigorous evaluation process, American Express incorporated ProVision as the company's standard business-modeling tool. The goal was to allow managers worldwide to document processes in a consistent fashion. Today, its 1000+ users are geographically disbursed throughout the US – in Miami, FL; New York; Minneapolis, MN; Phoenix, AZ; Salt Lake City, UT; and Greensboro, NC – and, globally, in Australia, Latin America, Japan, and the United Kingdom.

According to Ron Trosvig, a senior process architect in the American Express BMG, ProVision enables the group to document clearly the processes needed for a successful product or systems launch. "Conservatively, we move 20 to 25% faster with this tool," said Trosvig. "The benefit is in up-front planning. It's like the adage: 'Measure twice, cut once.' With ProVision, we find that we need to rework processes less often, because we have a better understanding of the requirements in advance. That saves time and money."

According to Trosvig, other key benefits of ProVision include

- Being user friendly
- Providing flexibility around developing and utilizing process methodologies
- Enabling the creation of detailed models and diagrams
- Capturing background process information
- Offering strong reporting features
- Allowing effective communication

"Most products are focused solely on data modeling. The strength of ProVision is that it effectively straddles the needs of technology and the needs of business, which is essential," Trosvig said. For global companies, the ability to document processes with a tool like ProVision simplifies the prospect of reuse, Trosvig added. "If someone in Phoenix executes a re-engineering project, ProVision allows us to have that document easily available for someone in Sydney to use as a starting point with his project."

The BMG's global partners use ProVision for a number of needs:

- Continuous process improvement
- Six Sigma
- Process re-engineering
- Process documentation (for training, communication, etc.)
- Process management
- Systems development
- Design of new business/opportunities/products

As the American Express re-engineering initiative progresses, Trosvig plans to continue the global rollout of ProVision. He expects ProVision users within the company to continue to increase on a worldwide basis. To facilitate that expansion, American Express is developing an internal ProVision user forum to discuss product usage, tips, and techniques.

## **15. Company Offices**



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ProVision, Version 4.4

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## Process Simulator

Version: 4.0

### ProModel Solutions

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#### 1. Product Overview

ProModel Solutions' Process Simulator is an economical and easy-to-use flow-chart-based process simulation tool whose dynamic animation capabilities make it powerful enough to provide meaningful insight and decision support for modeling and analyzing a range of business processes.

Table 1 provides an overview of Process Simulator. Process Simulator utilizes Microsoft Visio's for its front-end diagramming tools and ProModel's simulation and analysis technology on the back-end. It incorporates a flexible and intuitive interface for process diagramming, but also provides access to dynamic analysis, sensitivity testing and scenario evaluation capabilities that, until only recently, were primarily available only in higher-end simulation environments.

Process Simulator's tight integration with Visio allows users to quickly and easily simulate Visio flowcharts, Value Stream Maps and workflow diagrams. In addition, models generated with Process Simulator feature also automatic performance tracking and visual animation, enabling effective communication by helping all constituents see the impact of proposed changes, making it a general process modeling and analysis tool for improving business processes of all types.

**Table 1. Overview of Process Simulator**

Process Simulator	General-purpose flow-chart-based process simulation tool that functions as an ad-on to Microsoft Visio: Visio serves as the diagramming front-end and ProModel's simulation technology provides the ability to simulate Visio flowcharts, Value Stream Maps, and workflow diagrams. Processes can be defined using virtually all of the process-oriented templates provided in Visio, including those developed by third parties. Models generated with Process Simulator feature automatic performance tracking and visual animation. Utilizes the Visio diagramming tools, database (with models stored as standard Visio .vsd files), and repository. Process Simulator can also utilize Visio Shared Workspace, which supports collaboration via Microsoft Windows SharePoint Services, enabling users to share models over the web or embed them in other documents and applications. Process Simulator can be used to help make decisions for a range of process improvement applications, including Lean, Value Stream Mapping, and Six Sigma.
Statistical Fit/Data Analysis	Process Simulator integrates with the Strat:Fit statistical analysis package (marketed by Geer Mountain Software), which automatically fits continuous distributions, compares distribution types, and provides an absolute measure of each distribution's acceptability. It also translates the fitted distribution data into specific form, directly readable by Process Simulator.



## 2. Product Architecture

### 2.1. Architecture Overview

Figure 1 provides an overview of the Process Simulator architecture. Process Simulator functions as a Visio plug-in designed to enhance a Visio flowchart with simulation and animation capabilities, thus allowing users to create and run simulation models seamlessly inside the familiar Visio environment. It also integrates with Microsoft Excel for additional reporting and analysis capabilities and with the Strat:FitStat statistical analysis package (sold by ProModel technology partner Geer Mountain Software).

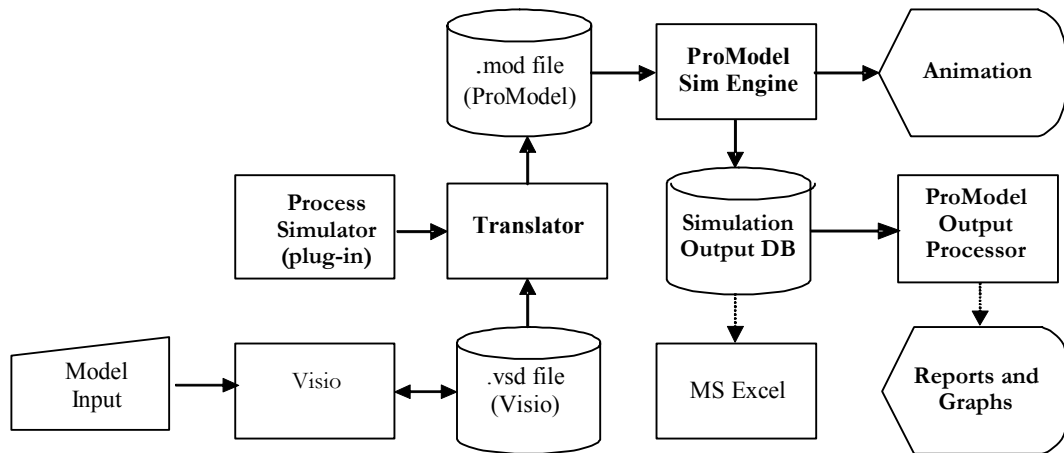


Figure 1. Process Simulator architecture.

### 2.2. Usability and User Interface

There are a number of simulation products on the market. Most of these, however, are fairly complex, requiring a considerable learning curve. Or, they have been developed for specific vertical markets. Process Simulator is a general-purpose, end-user-friendly simulation and analysis tool designed for business managers.

Process Simulator features an intuitive interface that basically functions as a supplemental component within Visio. The procedure for building and simulating a model using Process Simulator consists of creating a process flowchart in Visio, adding simulation properties, and running the simulation. Process flowcharts like the one shown in Figure 2 are easy to create using Visio’s drag-and-drop paradigm. Simulation properties are then added to the flowchart through (Process Simulator) dialogs that appear for each shape in the flowchart. Activity times, routing rules, and resource schedules are all easily defined. Figure 2 shows simulation properties being defined for “Activity 2.”

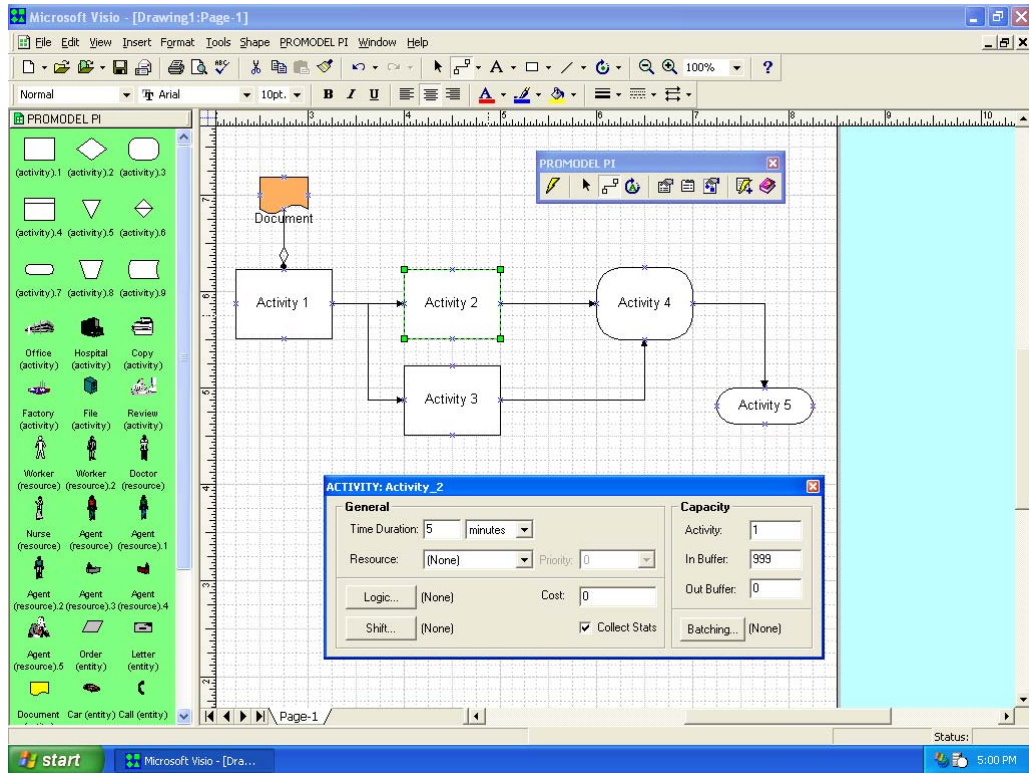
The simulation of the process flowchart is accomplished by clicking on a play button. As entities animate through the defined activities, values such as throughput and cycle times are dynamically updated and displayed on the flowchart. Users also have the capability to increase or decrease the speed of the animation in order to study the behavior of their model in a better way.

Process Simulator’s functionality is tightly integrated with Visio. For example, property dialogs for flowcharting shapes are modeless so that all the user has to do is simply click on different shapes to show the property dialog for each shape.

The Process Simulator GUI also enhances Visio functionality. For example, an important feature found in Process Simulator is the Object Explorer, which displays the names of all of the shapes in a flowchart. As shown in Figure 3, Object Explorer displays routings coming from each activity together with the

routing rules of each. Users can easily display the properties for each object by simply clicking on objects in the tree structure or by clicking on shapes in the process flowchart.

Process Simulator can also utilize Visio Shared Workspace, which supports collaboration via Microsoft Windows SharePoint Services, thus allowing users to share models over the web or embed them in other documents and applications.



**Figure 2. Process Simulator GUI**

**2.3. Repository Options/Team Development**

Because the Process Simulator modeling tool is based on Visio and utilizes the Visio database, all repository support provided by Visio is available to the user. This includes Shared Workspace, which supports collaboration with Microsoft Windows SharePoint Services. In addition, Process Simulator stores its model data in a Visio .vsd file that can be converted to XML or read as is.

All of the repository capabilities provided by Visio are supported in Process Simulator. However, it does not automatically assume that an activity in one diagram with the same name as an activity in another diagram is the same activity. The next release of Process Simulator (version 4.0) will feature a hierarchical modeling capability that will support linked diagrams so that when a linked diagram is updated, any diagram linking to this diagram will be automatically updated as well. This will allow a repository of diagrams and activities to be shared by multiple users with automatic updates. The hierarchical modeling capability is slated for release in the next version in April 2005.

**2.4. Integration with Other Products**

In addition to offering seamless integration with Visio, Process Simulator can integrate with MS Office applications and the Strat:Fit and MINITAB statistical analysis packages (discussed in Section 3.4.5).

Process Simulator also has the ability to export directly to a ProModel .mod file, which enables more advanced simulation and optimization capabilities offered with other ProModel products.

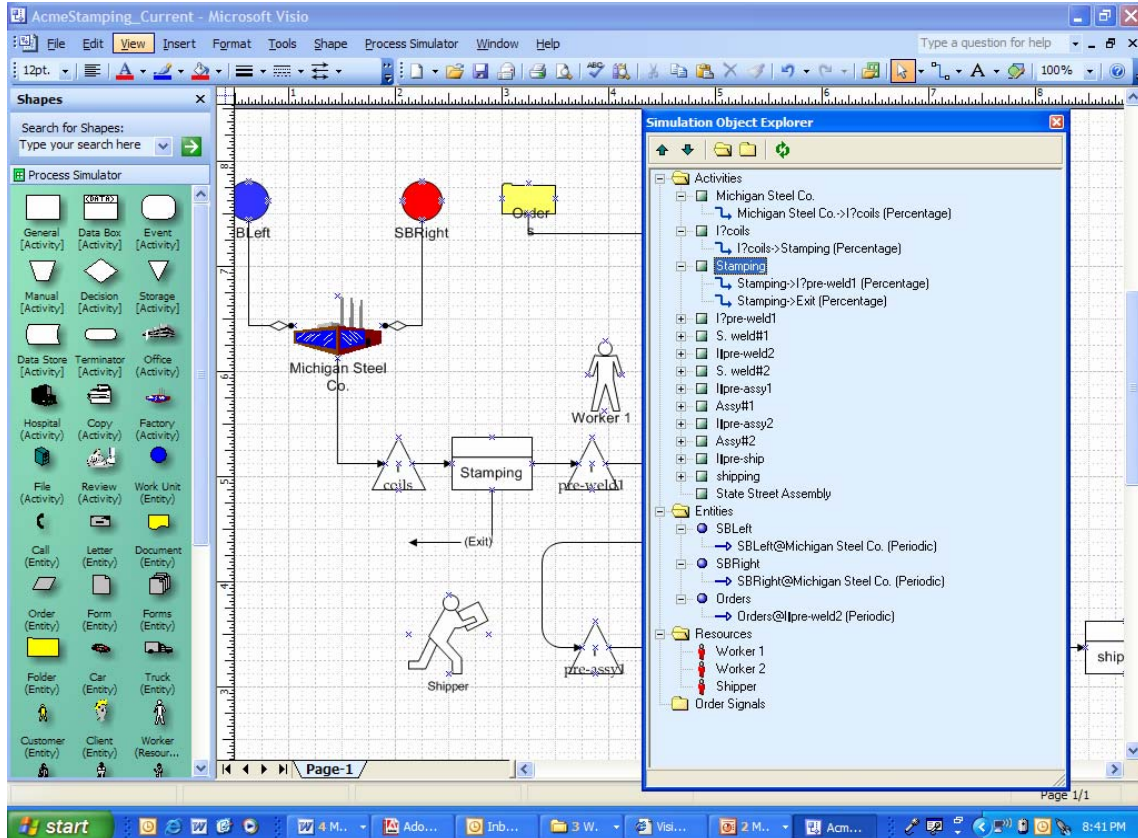


Figure 3. Process Simulator GUI showing Object Explorer functionality.

### 3. Analysis and Process Modeling

#### 3.1. Enterprise and Organization Models

Process Simulator is a simple, yet flexible, flowcharting simulation tool that can simulate Visio flowcharts, Value Stream Maps, and workflow diagrams. It can be adapted to a number of architectures. Virtually any graphical representation or template supported in Visio can be used in Process Simulator. (Basically, Process Simulator is not diagram specific, so any diagram may be used so long as it can be adapted to a process flow paradigm.)

##### Enterprise Architecture Models

Process Simulator does not provide direct support for any of the popular enterprise architecture models (e.g., Rummler-Brache, Zachman Framework, etc.); however, these models can be adapted to run in Process Simulator.

##### Organizational Models

Process Simulator can be used to map processes to organizational or functional areas through the use of swim lanes or other visual partitioning that might be meaningful to the user.

##### Resource and Cost Modeling

Process Simulator is capable of modeling all types of resources, including equipment, human, consumable, and service resources. Resources can be shared and allocated based on the priority of tasks. Additionally, cost, schedules, and usage rules can be defined for them.





### **Mapping Organization Strategies to Performance Measures**

All key process performance metrics are automatically reported, including processing time, value-added and non-value added times, throughput, resource utilization, and so on. Additionally, custom statistics can be gathered, such as time in a subprocess. Users, thus, have the ability to arrive at meaningful balanced scorecards for their particular processes. This allows the user to visualize performance metrics from multiple perspectives (i.e., cost, utilization, service level, and efficiency).

### **Managing Process Portfolios**

Process Simulator utilizes the Visio database, meaning that all repository support provided by Visio is available to the user. This includes Shared Workspace, which supports collaboration with Microsoft Windows SharePoint Services.

Visio diagrams saved on a Windows SharePoint Services workspace can be opened directly in Visio from the workspace (through a drop-down list box). When a diagram is opened from a Windows SharePoint Services workspace, Visio opens a Shared Workspace task pane that contains all of the information in the workspace, including other files, members, tasks, and links.

## **3.2. Defining Processes**

### **Defining Processes**

In Process Simulator, processes are defined as a process flow diagram in which activities (represented by any shape chosen by the user) are connected to represent the processing sequence for the items being processed. Information about each activity used to drive the simulation is supplied through property dialogs for each shape. Additionally, the user can define supplemental text and properties for each shape for documentation purposes.

### **Processes Information Storage and Integrity**

See Section 3.1.5.

### **Graphical Notations**

Process Simulator can simulate Visio flowcharts, Value Stream Maps, and workflow diagrams. Virtually any graphical representation or template supported in Visio can be used in Process Simulator.

Process Simulator does not support BPMN.

Process Simulator does not directly support UML 2.0 activity diagrams; however, the program is flexible, and could be customized to incorporate the diagrams.

## **3.3. Subprocesses and Activities**

### **Handling Subprocesses and Activities**

In Process Simulator, users define subprocesses by graphically creating the desired decomposition. Currently, only a single Visio page is supported, although the page can be expanded to be as large as necessary. However, hierarchical modeling and multi-page support will be incorporated in the next release, due to be shipped in April 2005. These new hierarchical modeling features will allow the capture and simulation of subprocesses and activities.

### **Defining Activities**

Activities are defined by either entering the time and resource required in the properties dialog for the activity, or by defining more detailed logic using a command language that enables multiple resources to be captured and entities to be accumulated. Cost, resource, and time data are all stored with the activity.

### **Documenting Decision Rules**

Process Simulator provides numerous built-in rules for activities and routings. Activity rules include batching before or after an activity and the use of buffering. Routing rules include the following:

- Percentage



- Conditional
- Ordered
- Outlet
- Attach
- Detach

Additionally, users can define custom rules for activities and routings, using inference logic and testing the value of attributes and variables.

#### **Rules Entry**

See above.

#### **Activity Costs, Resources, and Time**

Process Simulator stores cost, resource, and time data with the activity.

### **3.4. Simulation**

#### **Simulation Capabilities**

Process Simulator uses a Discrete Event simulation engine that takes a Visio flowchart, adds operational properties, and simulates the process. Included is a scenario analyzer that enables users to define, run, and compare multiple scenarios.

#### **Analytic Capabilities**

Users can use Process Simulator's simulation features to conduct various analyses, including

- Creation and simulation of alternative process scenarios
- Simulation and analysis of "as is" and "to be" workflow models
- Time-based quantitative impact analysis
- Predicting resource requirements, capital equipment investments, process times, and service levels, etc.

#### **Real-time Data Utilization**

Process Simulator cannot interact with other applications while running.

#### **Model Distribution and Simulation on Enterprise Networks**

Because Process Simulator models are stored in a standard Visio .vxd file, users can share models over the web as well as embed them in other documents and applications.

#### **Statistical Fit/Data Analysis**

Users can fit input data to distributions using the Strat:Fit add-on tool. Strat:Fit is a comprehensive yet user-friendly curve fitting package developed and marketed by Geer Mountain Software (a ProModel technology partners). It is available as an option with Process Simulator.

Strat:Fit will take raw data from spreadsheets, text files, or manual input, and fit the data to convert the data into the appropriate distribution input into a format directly readable for use by Process Simulator. It automatically fits continuous distributions, compares distribution types, and provides an absolute measure of each distribution's acceptability. It also translates the fitted distribution into specific forms for use in Process Simulator.

Process Simulator users can also export data to the MINITAB statistical analysis tool (marketed by MINITAB) in order to conduct more advanced statistical analysis.

#### **Capture and Reporting of Simulated Metrics**

Process Simulator can dynamically display simulation output during the simulation and store simulation output in an output database. Included is a 3D Report Viewer that shows process performance over

time, including cycle time, throughput, resource utilization, and cost. As shown in Figure 4, Process Simulator’s 3D Report Viewer displays these statistics in both report format and 2-and3-D graphs. In addition, users also have the choice of exporting output statistics to Excel for further graphing and analysis. Simulation output can also be accessed through ActiveX.

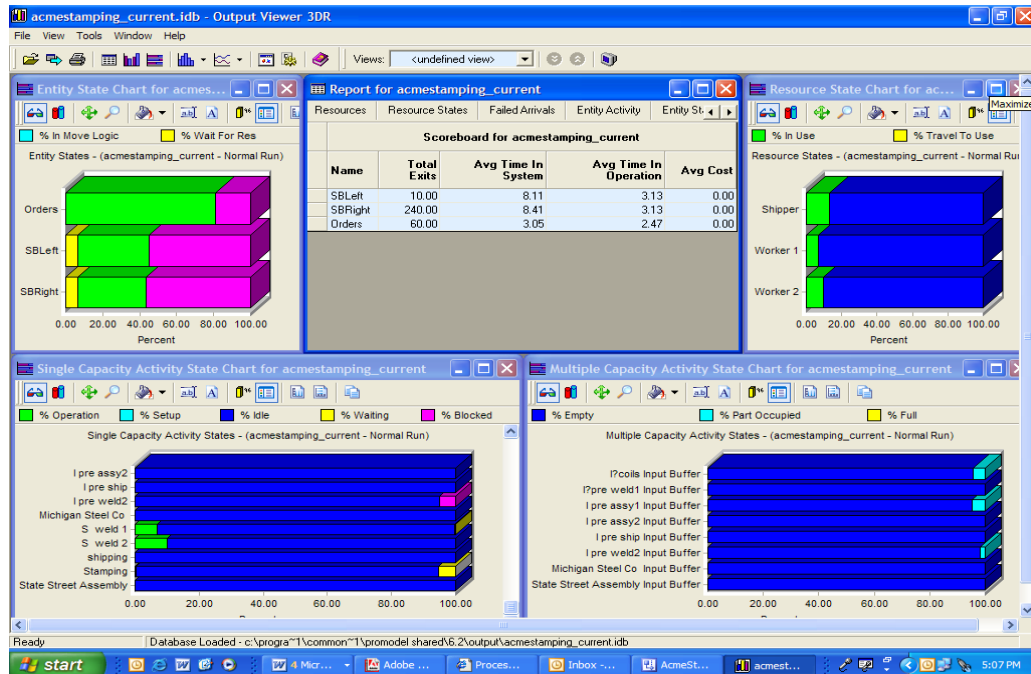


Figure 4. Process Simulator 3D Report Viewer Displaying Simulation Results.

## 4. Business Process Methodologies

### 4.1. Business Process Methodologies

Process Simulator is based on a simple flowcharting methodology that anyone can pick up in minutes. Activities are connected by arrows depicting the activity sequence of work items. And each activity has properties defined by data entry to a properties dialog.

Processes can be defined using virtually all of the process-oriented templates provided in Visio, including those developed by third parties. Process Simulator can be adapted to a number of templates and frameworks. Adapting to any process-flow template such as UML requires only that simulation properties be added to any of the shapes and connections representing the process activities and flow. Additional shapes and operational information can be easily added to a diagram if necessary to make it simulation-ready. For example, in the world of LEAN, users are using Value Stream Maps as a popular template and framework for the LEAN methodology.

### 4.2. Six Sigma Support

Process Simulator does not package any direct process support (i.e., best practices, etc.) for Six Sigma. However, it can be used in the Define, Analyze, and Improve steps by Six Sigma teams. In addition, users can export Process Simulator’s output to the MINITAB statistical analysis software, which provides a range of statistical capabilities for Six Sigma, statistical process control, Design of Experiments (DOE), and other quality improvement projects.

## **5. Report Generation and Document Management**

Process Simulator stores output statistics in a file that is compatible with MS Access. A custom output viewer is provided for viewing output reports and graphs. The output file is also exportable to Excel and other statistical analysis apps that support CSV files. Users can also create custom interfaces through the ActiveX channel made available to the user.

## **6. Development Environment**

### **6.1. Language of Tool**

Process Simulator is written in Visual Basic .NET. Models are created in Visio and stored in a standard .vsd file. The utilization of the Visio file structure ensures that updates are compatible with the Visio file specification.

### **6.2. Product Support, Maintenance, and New Versions**

Process Simulator has an Auto Update feature for downloading program updates over the Internet.

## **7. Software Modeling and Code Generation**

Process Simulator generates ProModel model files that can be read directly into other ProModel products for more detailed modeling and simulation. However, it does not automatically generate code for managing a process.

### **7.1. UML Model Generation**

Process Simulator is a flow-chart-based process simulation tool and therefore does not support UML model generation.

### **7.2. BPEL Generation**

Process Simulator does not generate BPEL.

## **8. Templates and Frameworks**

As mentioned earlier, Process Simulator is a simple, yet extremely flexible, flowcharting simulation tool that can be adapted to a number of templates and frameworks. Processes can be defined using virtually all of the process-oriented templates provided in Visio, including those developed by third parties.

## **9. Systems Administration and Security**

Process Simulator relies on the shared document capabilities provided by Visio for administering and securing the user environment.

## **10. Scalability**

Process Simulator provides scalability through the export of Visio models to full ProModel models that provide large-scale simulation capabilities.

## **11. Platforms**

Process Simulator runs on Windows XP, Windows 2000, Windows 98, or Windows ME. It requires Microsoft Visio 2000 or higher.

## 12. Pricing

ProModel offers several price points for Process Simulator, starting as low as US \$3,500 for a single seat to \$80,000 for 40 users. The company also offers on-site training and “Jump Start” programs to ensure client success.

As with many software products, typical maintenance and support costs are at 15% of the initial investment. ProModel’s technical services are offered typically on a per-project basis and based on a defined scope of work.

## 13. Company, Product Positioning, and Support

### 13.1. Company Background Information

ProModel Solutions is a privately held company that was formed in January 2000 as a result of the merger between ProModel Corporation and QuestOne Decision Sciences. ProModel Corporation, founded in 1988 in Orem, UT, USA, was a leader in advanced simulation technology. QuestOne Decision Sciences, founded in 1987 in Bethlehem, PA, USA, provided decision support solutions. Today ProModel Solutions combines professional services and innovative technology to deliver business process optimization and decision support solutions to the pharmaceutical, healthcare, financial services, and manufacturing and logistics industries.

ProModel offers a number of simulation-based business process improvement products. These include Process Simulator (a Microsoft Visio add-on), Project Simulator (a Microsoft Project add-on), Portfolio Simulator (a PPM add-on that can link to Microsoft’s EPM and other data sources), ProModel (a powerful general-purpose simulation package), MedModel (a general-purpose simulation packaged for healthcare), EMERGENCY DEPARTMENT Simulator (an application-specific tool for healthcare), ServiceModel (a general-purpose simulation tool for the service industry), and other ProModel products.

Today, there are over 4,000 users of ProModel’s products. The company has served 43 of the top Fortune 100, including Pfizer, Johnson & Johnson, Ford, UPS, General Motors, GE, DuPont, Lockheed Martin, Northrup Grumman, IBM, and the US Department of Defense. ProModel has also worked with many of the nation’s most progressive hospitals, some of which include Baylor Health System, Duke University Medical Center, HCA Doctors Hospital (Augusta GA), Mayo Clinic, and Miami Valley Hospital.

ProModel has approximately 50 employees (Sales: 10; Consultants: 15; Support: 8; Administration: 5) and over 50 worldwide independent sales representatives.

Major ProModel investors include Safeguard Scientifics, Inc., PA Early Stage Investors, and Pfizer Corp.

### 13.2. Positioning

Process Simulator’s ability to add simulation and dynamic (animation) capabilities to Visio makes it a general-purpose business process modeling and analysis tool that can support

- Process modeling and analysis, redesign, and improvement
- Detailed process modeling and analysis through simulation
- Development of management and measurement systems

As a general-purpose modeling and analysis tool, Process Simulator can be used to help make decisions for a range of process improvement efforts, including

- Resource planning
- Resource management
- Capacity planning

- Throughput analysis
- Capital equipment justification
- Inventory control
- Supply chain planning
- Supplier quality programs
- Process flow analysis
- Time compression management

For business process analysis and re-engineering, Process Simulator can be used to quickly create “as is” and “to be” workflow models, while its simulation and animation features support detail process modeling and analysis, allowing users to understand time-based quantitative impacts of changes quickly. It is also useful for predicting resource requirements, capital equipment investments, process times, and service levels.

For Lean and Value Stream Mapping, users can apply Process Simulator to capture Value Stream Maps in Visio and see what performance gains might be expected before implementing any actual changes. For instance, users can also simulate alternative scenarios to understand which LEAN project will give the biggest benefit.

Finally, Process Simulator can be used for Six Sigma projects – for example, to test the impact of variability on a process and understand the impact of reducing the variability on Six Sigma metrics – all within the familiar Visio environment.

### **13.3. Product Training**

ProModel offers several Process Simulator training courses.

#### **Process Simulator Training**

Process Simulator training consists of a one-day class of hands-on training with a ProModel instructor at the ProModel training facility. (On-Site Training is also available.) This class is designed to teach users everything they need to know to use Process Simulator successfully. Attendees learn how to build models from scratch as well as how to add simulation parameters to existing Visio flowcharts and workflow diagrams. The course covers both manufacturing and service examples and discusses the proper use of statistical distributions in simulation modeling.

#### **Two-Day Jumpstart Class**

This class consists of the one-day basics class plus a second day of working closely with the instructor on the attendee’s own applications. The goal is provide attendees with their first completed application-specific model.

### **13.4. Business Process Consulting**

ProModel offers services and custom solutions for software implementation, and consulting in manufacturing, logistics, business reengineering, LEAN enterprise, healthcare, government, pharmaceuticals, and financial services.

## **14. Case Study**

IBM was looking to understand the impact of adding technology to their business-to-business (B2B) order transaction process. Automated order handling was thought to reduce errors in orders, and, with a forecasted increase in server sales and new product offerings, a reduction in head count and lower “cost per transaction” was anticipated. The outlay in technology, software, and hardware could be measured in millions of dollars with additional costs allocated for IBM internal resources to implement the new system.

**ProModel Solutions****Process Simulator, Version 4.0**

The office of the CIO wanted to understand the impact of this implementation and contracted ProModel technical services to construct a flexible model using ProModel software. The goal was to replicate the "as is" order transaction process and allow IBM to run hundreds of "what if" analyses on a large number of "to be" proposed process changes.

The modeling and analysis effort consisted of a team of four people from IBM and three from ProModel operating over a period of twelve weeks. The subsequent model that was developed included over 1200 flexible process steps, each with dynamic and variable process times, over 50 different types of resources, and 2 methods of collecting costs (including activity-based and usage-based).

The model was able to run forward three years worth of orders (dynamically) in about 3 minutes, and provided key decision support metrics, including cost per transaction, labor demand over time, work in process, error reductions, and many others. In addition, scenarios reflecting different potential demands and changes in the overall process were run to evaluate the impact of proposed changes quickly.

Based on the dynamics of the simulation, key findings demonstrated that IBM could phase in certain technical improvements, thereby deferring costs and investments over time. In addition, ProModel's dynamic simulation capabilities helped IBM focus on the processes that needed improvement first, through a *sensitivity analysis*. Additional findings identified with the model revealed that staff reductions needed to be planned and work re-allocated in order to avoid impacting service levels and causing bottlenecks.

## 15. Company Offices

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## **xBML™ Modeling Suite**

### **xBML™ Innovations**

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#### **1. Product Overview**

Different companies have come to the business process modeling space from different traditions. Some companies began by developing software modeling tools and then moved into the business modeling space. Some began as process modeling tools and have extended their products to support enterprise architecture modeling. Others, like xBML™ Innovations, began with a business modeling methodology and then developed a software tool to help implement that methodology. Their xBML (eXtended Business Modeling Language) methodology was developed and tested in Fortune 500 companies over the course of some 20 years. The company is heavily committed to their approach and has tailored the tool to the methodology. Where some tools are flexible and can be used with different notations or different architectural models, the xBML Innovation's product is completely focused on making it easy for users to implement the xBML methodology. Thus, in a real sense, deciding to acquire and use xBML Innovations depends entirely on whether or not you want to use the xBML business modeling methodology.

The xBML methodology is based on understanding, capturing and manipulating the elemental business information. The methodology organizes information into five basic elements or dimensions:

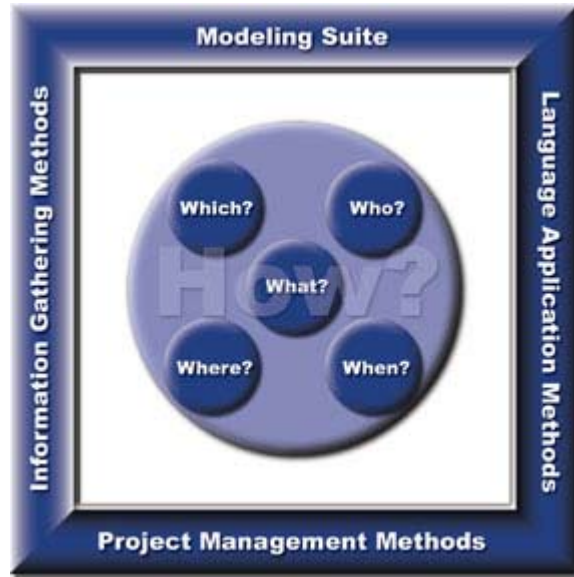
- WHAT activities are to be performed,
- WHICH information is consumed or produced by the activity,
- WHO performs the activity,
- WHERE the activity is performed,
- WHEN the activity is performed, and

Once defined using xBML, these individual elements can be reintegrated to create a representative model of the entire business – the HOW model – describes a business process. The xBML methodology is enhanced by a framework which contains methods for efficiently gathering the elemental business information and extensive reuse of the information for all corporate initiatives. (See Figure 1).

Thus, unlike methodologies that begin with high-level organization models or business process flow models and then dig down into the specifics, xBML begins by focusing business managers on the definition of specific activities and features associated with specific activities, including the people who perform the activities and the locations and resources used by the activities. In effect, one creates a repository that describes the basic elements involved in processes first, and then assembles the specific information into a process model.

Based on their experience, xBML Innovations believes this approach makes it easier and faster for business managers to analyze their organizations and then create comprehensive business process models in a systematic fashion. Additionally, the rigor of the information gathering methods and the language allows for the reuse of the same business models for Enterprise Architecture initiatives, process improvement initiatives, business requirements, Sarbanes-Oxley and others. Manager's work together with analysts to define the business elements within a department or an entire enterprise and then use the resulting models stored in the xBML Modeling Suite to define processes and to redesign or

improve them as appropriate. xBML considers process flows to be a depiction or analytic supporting representation of a business not a primary information gather mechanism.



**Figure 1. xBML Framework Overview**

The xBML Innovations’ Modeling Suite is based on and supports formal Information Gathering Methods, Language Application Methods (reuse) and Project Management Methods. The Language Application Methods and Reuse methods have been created to support many approaches to process analysis or change, including Six Sigma, Cycle Time Analysis, Activity Based Costing, Process Bottleneck Analysis and the development of documentation for Sarbanes-Oxley compliance. The xBML tool enables the business model to be the “single starting point” for all of these corporate initiatives.

**2. Product Architecture**

The xBML Modeling Suite natively stores data in an open, easily transformable eXtensible Markup Language (XML) format and currently consists of six different products: the Client Workbench, the Client Reader, the Web Reader, the xBML Reporting Wizard, the Enterprise M2 (Model Manager), and the xBML Model Manager Web Interface. The xBML Client Workbench and Reader can work independently or with the Enterprise Model Manager. The Client and Web Reader provide users access to models via PCs or the Web.

**Table 1. Overview of xBML Modeling Suite**

The xBML Client Workbench	The xBML Client Workbench is used by managers to define the elements of the xBML Framework and assist in the creation of process models and structured xBML solutions. Developed using the Microsoft.NET framework and built on top of an open data format (XML), the Client Workbench uses the latest technology to deliver a simple, yet functional application that adheres to the xBML Methodology guidelines.
The xBML Client Reader	The xBML Client Reader is designed to be a cost-effective solution for delivering an interactive ability to read, review, and print xBML solutions, without the ability to modify the contents. The Reader can move, arrange, and show/hide, etc., giving the solution author the ability to depict information in an intended, digestible format. The xBML Client Reader is an ideal solution when the intended audience is a known size.
The xBML Web Reader	The xBML Web Reader is installed with any xBML Client Workbench or Reader product. Designed to streamline the distribution and sharing of xBML solutions, the xBML Web Reader allows you to distribute your files in the same fashion as an Adobe

	PDF. Users who have this feature will be able to view your solutions right in their web browser, with the capability to view, print, preview page breaks, expand/collapse, and similar read-only functions.
The xBML Reporting Wizard	The xBML Reporting Wizard adds complete and custom reporting functionality to the xBML Client Workbench and Reader. Offered as an add-on to the xBML Client Workbench and Reader offering, the Reporting Wizard can produce detailed reports from xBML models such as IT Requirements.
The xBML Enterprise Model Manager (Enterprise M2)	The xBML Enterprise M2 (Model Manager) is designed to be a scalable way of sharing and editing of xBML solutions in a multi-user environment. With version control capability down to the object-level, the xBML Enterprise M2 (Model Manager) enables multiple users to edit the same model at the same time, all the while ensuring that your data is consistent and correct.
The xBML Model Manager (M2) Web Interface	The xBML Enterprise M2 Web Interface adds remote, global access to the xBML Enterprise M2, anywhere there is an internet connection, any time of day. Offered as an add-on to the Enterprise M2 offering, the Web Interface completes the enterprise picture with a unique flexibility never before offered.

### 3. Architecture Overview

#### Enterprise Architecture Overview

Figure 2 provides an overview of the architecture of the xBML Innovations Enterprise Model Manager. The Enterprise Model Manager is represented by the top box. Information is put into the Model Manager via the Client Workbench on one side and accessed by Client Reader on the other, or via the Web Readers shown below.

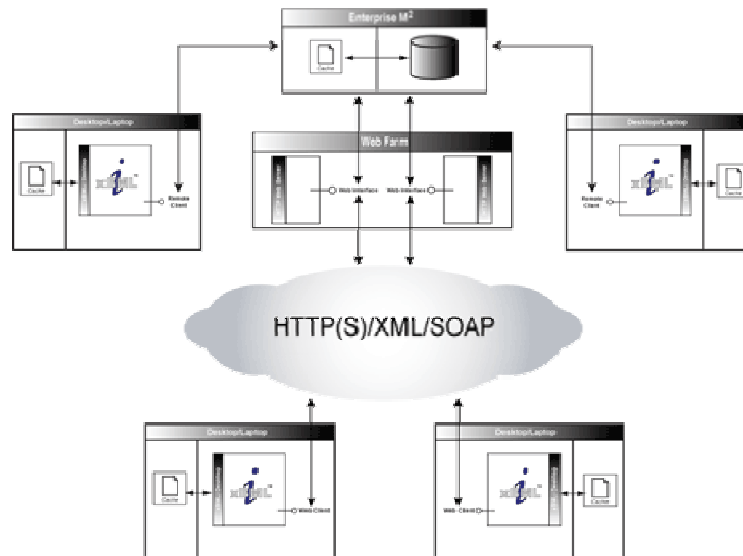
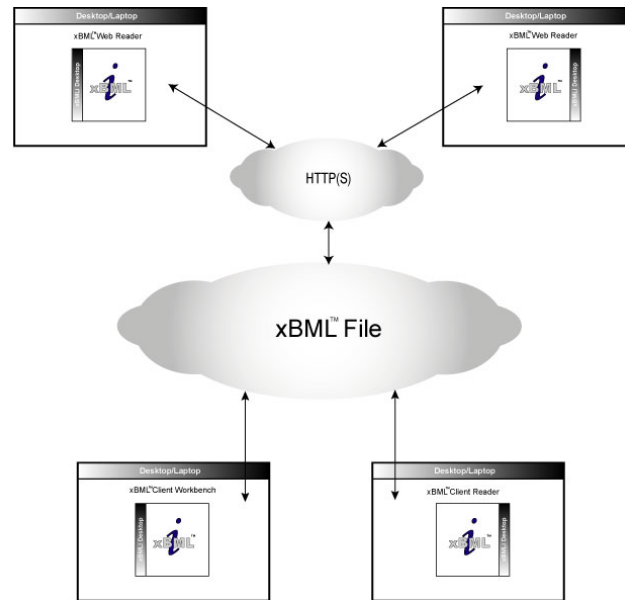


Figure 2. xBML Innovations Enterprise architecture.

#### Client Architecture Overview

Figure 3 provides an overview of the architecture of the xBML Innovations Client. An xBML File is created using the xBML™ Client Workbench, and the xBML™ File can be reviewed and read with the xBML Client Reader locally, or with the xBML Web Reader via the Internet, show by the top two boxes below.



**Figure 3. xBML Innovations Client architecture.**

All xBML products are built within Microsoft’s .NET Framework and perform familiar Microsoft features, including cut and paste, copy, spell checking, and undo. Similarly, xBML environments can link with other standard Microsoft environments, including Excel spreadsheets and Word documents.

**3.1. Usability and User Interface**

The xBML Modeling Suite was designed with business users in mind, by decomposing process elements into five dimensions, and guiding entry of information in a step-by-step logical process. With the familiar look, feel, and functionality of all Microsoft Office products, the business user will feel right at home using any of the products in the xBML Modeling Suite. The xBML Modeling Suite provides intuitive object creation (ie. WHAT, WHICH, WHO, WHERE, WHEN) and formatting and with extensive standard and context sensitive help, the user can quickly and easily find answers to common questions.

A user accesses models via the Client Workbench, and can change any model from the Workbench. Users can also access models from either the Client Reader or the Web Reader. The reader products do not allow users to edit models and are intended for the business community that primarily wishes to read, review, and print the models. All user interfaces of the xBML Innovations Modeling Suite are very consistent and have a similar look and feel to all Microsoft Office products. This ensures that people who are familiar with Microsoft Office products’ look, feel, and functionality will be very comfortable creating models using the xBML Innovations Modeling Suite.

For more advanced users, the xBML Modeling Suite offers features such as Profiling, Sub Modeling, Transformations, Reporting, and advanced formatting options. Through profiling, technical and non-technical users can define a re-usable data structure that defines strongly typed attributes describing the structure. Additionally, valid values can be assigned to these attributes providing valid, repeatable data. For example, a Job Description profile could be created with the following strongly typed attributes:

- Job Code (string)
- Job Description (string)
- Pay Rate (float)
- Performance Rating (integer)
- Exempt (boolean)

The attributes could then be assigned valid values, for example Performance Rating could be assigned values from 1 (lowest rating) to 10 (highest rating). Once the Job Description profile has been associated with a WHO object, a Performance Rating of between 1 and 10 could be selected. After the Job Description profile has been associated with WHO objects in the model, a report could then be outputted ranking all employees based on their performance rating.

The features and functionality that differentiate the xBML Modeling Suite from other tools include, Undo/Redo, automatic Activity Auto Numbering, intuitive Sub Modeling, Profiling, Power Builder feature that allows rapid creation of objects and links, Transformations, Reporting, Auto-save, Auto-version, Spell-check, Split-screen viewing, dock-able/floatable windows and toolbars and much more.

The xBML Modeling Suite provides native support for both the eXtensible Markup Language (XML) and the eXtended Business Modeling Language (xBML). In addition, the xBML Modeling Suite provides integrated transformations of XML using eXtensible Stylesheet Language (XSL) stylesheets.

The xBML Modeling Suite also contains support for deploying and viewing xBML Models over the Internet. Since each Client Workbench and Client Reader come with the Web Reader, models can be deployed over the web and then easily accessed by any number of people within the organization. The Web Reader offers the user an interactive environment including moving and resizing objects, expanding and collapsing legs and printing models.

### **3.2. Repository Options/Team Development**

The xBML Enterprise Model Manager (M2) relies on an XML database and can use any of the standard version control systems that support XML data storage.

xBML supports team development. Users can check out models from the Model Manager and version control is maintained down to the object level.

### **3.3. Integration with Other Products**

The xBML™ Modeling Suite was developed to natively support the eXtensible Markup Language (XML). XML is a simple, very flexible open text format that allows the exchange of a wide variety of data. Native support of XML means that the xBML Modeling Suite can easily and reliably import and/or export data to any number of source/target environments. The xBML Modeling Suite supports integrated transformations of XML using eXtensible Stylesheet Language (XSL) stylesheets. In addition to the standard set of stylesheets included with the xBML Modeling Suite, user defined stylesheets can also be used. For instance, the xBML Modeling Suite provides out-of-the-box integration with Microsoft's Office 2003 and Computer Associate's ERwin data modeling software. In addition, the xBML Modeling Suite provides integration with proprietary product interfaces.

xBML products can integrate with .NET Framework compliant products. They can also exchange XML data files with other products. A future release of xBML Modeling Suite will support the OMG's XMI protocol to facilitate the exchange of models with other modeling tools.

## **4. Analysis and Process Modeling**

xBML is designed to support the capture, storage, and re-use of all essential business information.. It does this by systematizing the capture of business information (WHAT, WHICH, WHO, WHERE, and WHEN) and then providing users with the ability to integrate relevant data together into process (HOW) models. Users can also define unique data types, called *profiles*, to capture information not otherwise provided for by xBML. Once defined, a profile is a reusable set of strongly-typed attributes, and their appropriate (or valid) values, that collectively describe the significant features of YOUR business, be it an Activity, Information, Organization, Role, Location, Time Frame, or the relationship between them.

What makes profiling unique, is that the data model for the application expands or contracts with the needs of your project and your business. You know what information your business needs to be successful – profiling enables you to capture and *use* it.

Through the xBML Modeling Suite and with the support of the xBML Framework, a user creates the foundation or elements to achieve a specific business purpose, including the WHAT, WHICH, WHO, WHERE, and WHEN dimensions. By dissecting the business into these building blocks, all of the business information is clearly, completely, and accurately captured. Once the elemental components have been captured, they can then be re-used to create the HOW or process model to show the complete process defined by the business purpose, including the WHAT, WHICH, WHO, WHERE, and WHEN.

Based on this elemental business information construct a user can perform very powerful analysis, including 2x2 affinity matrices, Business Case Definitions, Service-Level Agreements, Sarbanes-Oxley Control Usage, COTS Selection, WHO performs WHAT activity, WHICH information is consumed/produced by WHAT activity, WHO uses WHICH information, WHAT activities are performed WHEN, WHAT activities are performed WHERE, Activity Requirements, Information Requirements, Temporal Requirements, Logical Database Schema, Object Glossary, Recommended Maintenance Scripts (code generation), Microsoft Project 2003 templates, Inventory List, Project Estimation and much more. Since all of the data captured by the xBML Modeling Suite is in XML, the data can easily be transformed into just about anything imaginable.

#### **4.1. Enterprise and Organizational Models**

The xBML methodology is based on its own, proprietary enterprise model, based on the xBML framework described in Figure 1. This framework defines the types of business information that managers need to understand in order to define business processes.

##### **Enterprise Architecture Model**

xBML does not support alternative models in the sense that it allows you to represent alternative models on the opening screen or reorganize the repository to cluster diagrams to reflect other enterprise model categories. On the other hand, the xBML methodology constitutes a superset of all business modeling categories. In addition, the xBML Modeling Suite allows users to create *profiles* to define additional types of information that they might want to capture, store, and re-use. Information from the xBML Modeling Suite can be assembled to support most standard enterprise and organizational models. Thus, for example, xBML can be used to gather and document information to support the business rules model of FEA and the business architecture of the TOGAF. The ITIL and COBIT frameworks have both been modeled in the xBML Client Workbench as well as the FEABRM version 2

As a specific example; the business architecture from TOGAF calls for

- Organization structure. Identifying business locations and relating them to organizational units.

- Business goals and objectives. For each organizational unit.

- Business functions. A detailed, recursive step involving successive decomposition of major functional areas into sub-functions.

- Business Services. The services that each enterprise unit provides to its customers, both internally and externally.

- Business processes. Including measures and deliverables

- Business roles. Including development and modification of skills requirements.

All of the above are style sheet outputs form a complete xBML business model.



A Balanced Scorecard model can be created by establishing appropriate profiles and saving information needed for that approach. Thus, the Internal Process Perspective and Financial Perspective information is contained in profiles within the software and can then be formatted in any manner for presentation.

**Organizational Model**

xBML supports a superset of all organizational models, these models allow for organization, role, person or system, to be modeled. This model is referred to as a WHO Model. Figure 3 pictures a WHO Model. In this case, the manager or user captures information about the functional groups and the individuals who work for the organization. In Figure 3 functional groups like departments and employees are assigned different colors to make them easy to identify. Again, the functional groups and employees are arranged in a hierarchical and networked manner. Specific information about particular groups or individuals can be entered in the window on the right side. As in all the other dimensions supported by the xBML Modeling Suite, profiling may be used to capture project specific information for any WHO Object.

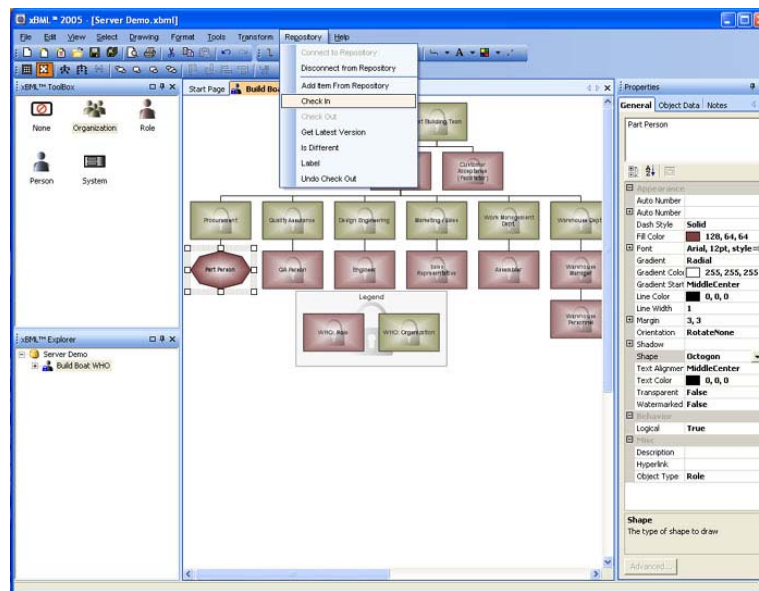


Figure 3. A WHO Model screen for capturing organizational and employee information.

**Resource and Cost Modeling**

Through the use of profiling, organizations can define their own unique cost definition. This definition can then be associated to ANY resource (e.g. organization, role, or person) within the xBML system, and subsequently assigned values. Once captured, this information can be extracted through reports to simulate ABC Costing, for example.

**Documenting Organizational Strategies to Process/Performance**

This is done as one defines activities. In essence the top activity in any hierarchy defines the goal or reason why the activity is performed.

**Measures**

Measure, Metrics and Targets are primary used for Process Improvement, Process Monitoring, and Strategic Modeling and can be stored in a profiles and can be attached to any activity

**Managing Process Portfolios**

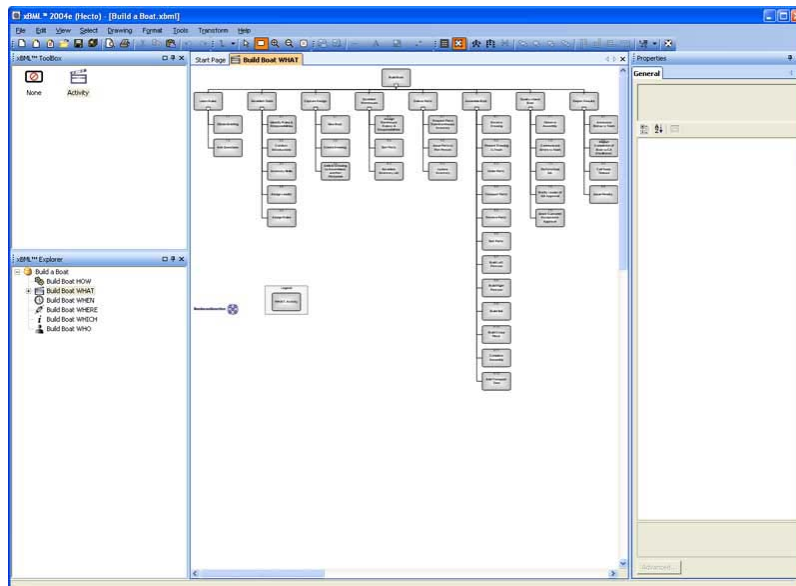
xBML Enterprise M2 manages all of the data gathered about the enterprise. Once HOW (process) models are defined, they too are saved in the repository. In essence, if one first defined all the activities in an organization, then defined all the processes in which those activities were used, one would have a

process portfolio. Thereafter, any change to any element in the repository would be reflected in the various processes.

**4.2. Defining Processes**

xBML defines processes by initially defining specific activities and hierarchies of activities, as well as other business elements, like organizations and employees, and then assembles processes from these elements. xBML considers activities to be the nucleus of all business.

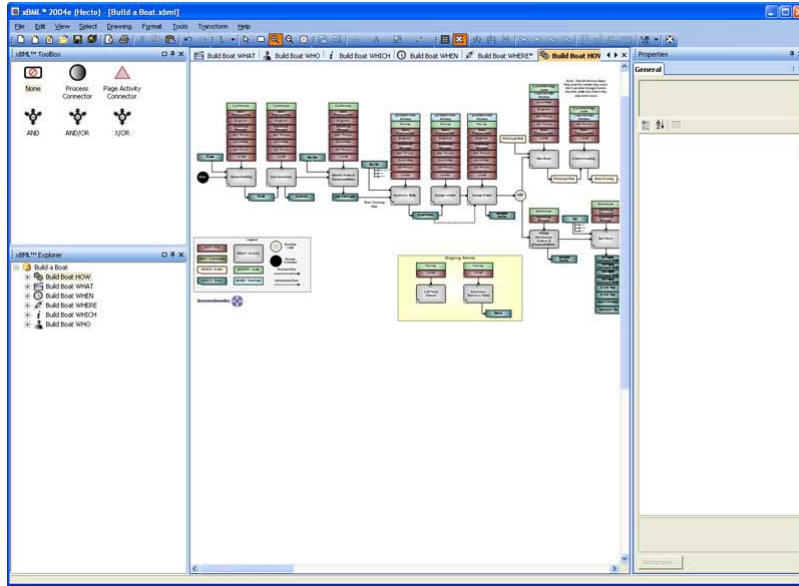
Figure 4 illustrates the screen used to capture a WHAT Model. Each box in the hierarchy in Figure 4 represents an activity. Activities are defined as discrete processes that produce specific outputs. Activities can be arranged into hierarchies of any depth. Subsets of activities can be revealed or hidden, depending on the project requirements. In analyzing activities, the manager or user does not need to concern him or herself with the process or processes any specific activity will be used in.



**Figure 4. A WHAT Model screen showing a hierarchy of activities.**

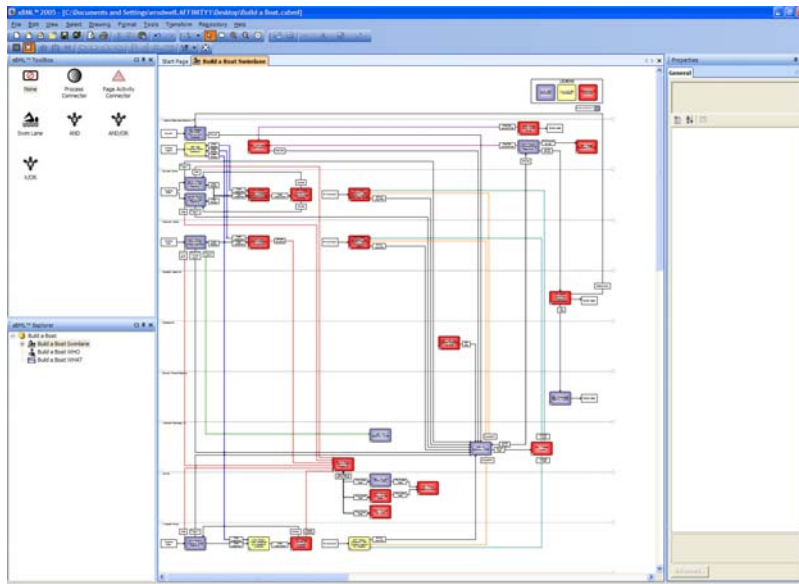
**Define Processes**

In xBML a process is defined as a set of activities that work together to produce some outcome of business value. In xBML, business processes are defined using the HOW Model. This model allows for the complete description of the business process and is the only tool that allows for the intelligent connection of all of these five business elements (WHAT, WHICH, WHO, WHERE, WHEN). The HOW model can range from a simple process showing only one dimension, to a complete process showing all five dimensions, as in Figure 5, or alternative depictions like swim lanes, as in Figure 6.



**Figure 5. A Complete HOW Model screen showing a business process with all of the elements defined (WHAT, WHICH, WHO, WHERE, WHEN).**

In Figure 5 you can see how a complete process is assembled from elements already defined in the WHAT, WHICH, WHO, WHERE and WHEN modeling environments. The activities (WHAT) are linked into a sequential flow or process which can include various loops and decision points. Then, employees and organizations (WHO), locations (WHERE), temporal constraints (WHEN), and required inputs and outputs (WHICH) elements are associated with specific activity boxes.



**Figure 6. An alternative depiction of a HOW model where the WHO objects are represented as swim lanes.**

**Process Information Storage and Integrity**

xBML is based on a precise semantics. Each item stored in the repository is defined to assure that the various elements can be combined. Changes in one element are automatically reflected in models that show assemblies of elements, as the process model does (HOW).

### **Graphical Notations**

xBML uses its own proprietary notation as there is no other depiction technique that combines all the elements of the xBML language in a process flow.. The xBML Modeling Suite also supports a swim lane view of elements if desired, as pictured in Figure 6.

### **4.3.Subprocesses and Activities**

Since the nuclear Model of the xBML framework is the Activity Model (WHAT), and processes are built-up from sets of activities and the relationships between them, sub modeling is inherent in xBML. In essence, one begins with the elements of the smallest subprocess and assembles higher level subprocesses, process and large scale business processes.

#### **Handling Subprocesses and Activities**

See above. Unlike most tools, that define processes and then dig down through subprocesses to activities, with the xBML Modeling Suite, one begins by defining activities which are at the heart of the xBML methodology.

#### **Defining Activities**

See above. Unlike most tools, that define processes and then dig down through subprocesses to activities, with the xBML Modeling Suite, one begins by defining activities which are at the heart of the xBML methodology. One defines activities with the WHAT Model.

#### **Documenting Decision Rules**

Decisions in the xBML Language are documented as the complete set of activities necessary to support the decision.

Inference logic can be modeled utilizing the xBML Language and the Profiling capability of the xBML Modeling Suite. Resource and time information is captured through the xBML Language, with costing data captured through the xBML Modeling Suite's Profiling capability.

#### **Rules Entry**

xBML supports the capture of rules through the use of profiles. Profiles can be defined to support all type of business rules and associate them with the activities (or other elements) which implement or comply with them.

#### **Activity Costs, Resources, and Time Data**

Capturing specific activity costs within the xBML Modeling Suite occurs in the same fashion resource costs are captured. Through the use of profiling, organizations can define their own unique cost definition. This definition can then be associated to ANY element within the xBML Modeling Suite, either on a global or instance basis, and subsequently assigned values.

In addition, through the combined use of costing profiles for all xBML objects, xBML users can define a complete costing model. Once defined, this information can then be extracted utilizing the integrated reporting functionality of the xBML Modeling Suite, and easily transformed into virtually any format.

### **4.4.Simulation**

#### **Simulation Capabilities**

xBML does not support simulation. It is possible to create and examine specific scenarios by transferring information about a process to an Excel spreadsheet and thus determining the cost or time involved in accomplishing a specific instance of a process.

This information can then be transformed and presented in any way that is applicable to the business purpose, whether analyzing activity-based costing (e.g. the impact of incorporating, removing, or changing the costs for an activity), performing robust multi-state scenario analysis, or incorporating fuzzy logic to discover the optimal path through a process.

### **Analytic Capabilities**

xBML Integration does not include analytics based on Discrete Simulation. It does allow users to use the analytic capabilities of spreadsheets.

### **Real-time Data Utilization**

xBML Integration does not support Real-time Data Utilization

### **Model Distribution and Simulation on Enterprise Networks**

xBML Integration does not support simulation of distributed systems.

### **Statistical Fit/Data Analysis**

xBML Integration does not support statistical data analysis. It does allow users to use the analytic capabilities of spreadsheets.

### **Capture and Reporting of Simulation Metrics**

Through the use of profiling, the xBML Modeling Suite does provide for the capture and reporting of simulation metrics. For example, a profile can be created which would capture metrics for an Activity such as effort per transaction, fixed cost and transactions per year. Another profile can be created which would capture metrics for a Role such as dollars per hour. When these profiles are assigned to a HOW model, reports can then be run showing the total cost for a process. Additionally, changes can be made to the process and another report can be run to show the new cost for the process.

## **5. Business Process Methodologies**

The xBML Innovations product is designed to implement the eXtended Business Modeling Language (xBML) methodology. The methodology defines an approach to capture, store, and re-use specific business information and then uses this information to define processes.

This approach has been proven in a wide range of activities (across a wide range of organizations) from defining a corporate level CRM Strategy, to identifying process improvement opportunities, to defining Federal Regulations. Additionally, to ensure the success of any xBML work-session, the xBML Framework includes language application, information gathering, and project management methods.

The xBML Modeling Suite supports the xBML Framework and its methods through encapsulating the rules defined by the xBML Language, providing a central repository for managing and re-using business information, providing a simple, intuitive interface for rapidly capturing business information *during* work-sessions, and finally providing a simple, flexible, and customizable way to extract and transform the business information. For instance, the xBML Modeling Suite provides a quantum improvement to traditional six sigma methods by providing a rigorous, repeatable way to define and capture the business process. Six sigma profiles can then be applied against this more accurate picture of the business, and be quickly transformed into a FMEA, Pareto Chart, or any other Six Sigma analysis technique the analyst determines as critical for success.

### **5.1. Business Process Methodologies**

The xBML Modeling Suite is tailored to support the xBML methodology. It gathers most of the data that basic business process redesign and improvement methodologies require. Moreover, by using profiles, one can create new data types and collect data required by a methodology like Six Sigma and Activity Based Costing. On the other hand the product doesn't automatically switch graphical notations to support the conventions of SCOR or IDEF methodologies.

### **5.2. Six Sigma Support**

Six Sigma practitioners can use the xBML Modeling Suite to model processes. By adding an event profile, practitioners can arrange to gather data that can be analyzed by statistical tools.

## 6. Report Generation and Document Management

One of the most powerful components of the xBML Modeling Suite is the ability to transform your work into other custom or standard formats. Whether your goal is to create an affinity matrix to help identify gaps, a Microsoft Project 2003 template, or a Complex Commercial Off-The-Shelf selection criteria matrix, your xBML models remain the central, core information repository that can be reused in many different facets, including but not limited to: Business Case Definitions, Service-Level Agreements, Sarbanes-Oxley Control Usage, Commercial Off The Shelf Selection, Affinity Matrices, WHO performs WHAT activity, WHICH information is consumed/produced by WHAT activity, WHO uses WHICH information, WHAT activities are performed WHEN, WHAT activities are performed WHERE, WHICH information Creates, Reads, Updates, Deletes by WHO, Activity Requirements, Information Requirements, Temporal Requirements, Logical Database Schema, Object Glossary, Recommended Maintenance Scripts (code generation), Microsoft Project 2003 templates, Inventory List., and Project Estimation.

## 7. Development Environment

The xBML Modeling Suite was developed using Visual Studio .NET as the development environment. It was created in Microsoft .NET Framework, and supports Web Services, Windows Services, XML, XSL, SOAP, and .NET Remoting.

The xBML Modeling Suite is extremely versatile with respect to maintenance and updates. Currently the software will automatically check (based on user preferences) for incremental updates and update the software automatically if needed.

### 7.1. Language of Tool

The xBML Modeling Suite is written in C# and makes extensive use of Microsoft's .NET Framework. It makes extensive use of XML and stores all its information in an XML database.

### 7.2. Product Support, Maintenance and New Versions

xBML Innovations provides email and phone support with valid maintenance subscriptions. In addition, users also have access to Frequently Asked Questions, Searchable Knowledge Base, and User Forums. Users with a valid maintenance subscription will also be entitled to new versions and product updates for the length of the maintenance subscription.

## 8. Software Models and Code Generation

The xBML Modeling Suite is designed to support business managers in the analysis and design of business processes and other corporate initiatives. The data gathered in the xBML Modeling Suite can be useful to IT development teams, but the xBML Modeling Suite does not directly support the generation of software models, like UML, or software code, like Java.

The xBML Modeling Suite natively stores data in an open, easily transformable XML format, thus the business information captured from the xBML Framework methods can be transformed into virtually any format. Many users use data from the xBML repository to generate 'enhanced' Use Cases (text versions of Use Cases), logical data diagrams, and software code skeletons.

### 8.1. UML Model Generation

The xBML Modeling Suite provides enhanced Use Case generation via the Reporting Wizard add-on.

### 8.2. BPEL Generation

BPEL generation is planned for a future release of the xBML Modeling Suite.



## 9. Templates and Frameworks

Several popular templates or frameworks have been modeled in xBML, including COBIT, BASEL II, Enterprise Management, eTOM, Finance, Healthcare, IDEF, ISO, ITIL, ITIM, Sarbanes-Oxley, SAP, Siebel, Six Sigma, and SCOR.

## 10. Systems Administration and Security

The xBML Modeling Suite provides team development through the Enterprise M2 repository. Security is based on users, and is setup and administered on the Enterprise M2 through an administration client. Administrators can turn on specific security such as read-only and write access on a model by model basis.

## 11. Scalability

The xBML Modeling Suite achieves vertical scalability through the Enterprise M2 repository. Through intelligent object-level locking, solution labeling, version control, and auditing, the Enterprise M2 repository allows 'limitless' users to access and modify solution content with the confidence that their changes will not impact the changes of others.

The xBML Modeling Suite achieves horizontal scalability through the flexibility of its product offering. Central process and documentation owners, through the use of the xBML Client Workbench, create and maintain xBML solutions. Once created, these solutions can be shared and reused across the organizational network with ease, most elegantly through the use of the Enterprise M2 repository, but also through simple solution management and education.

These solutions can then be deployed using a variety of different methods, from deploying and sharing the models from the Enterprise M2 solution, to deploying targeted xBML solutions over the web in a fashion similar to Acrobat PDFs. Once a deployment method has been selected, Subject Matter Experts and project sponsors, business owners, influencers, decision makers, and other interested parties can validate the solutions with the xBML Client Reader, giving them interactive access to the solutions without the ability to edit and save the content.

## 12. Supported Platforms

xBML Client (Reader & Workbench) run in Windows XP Professional, Standard, & Home Edition, Windows 2000, Windows NT 4.0 Service Pack 6a, Windows Millennium, and Windows 98, Second Edition

xBML Enterprise Model Manager (M2) runs in Windows Server 2003 and Windows 2000 Server.

## 13. Pricing

A copy of xBML Workbench costs \$5,000/seat. Client Reader costs \$500/seat. Web Reader is included w/Workbench or Client Reader purchase. Reporting Wizard costs \$1000/seat. Enterprise Model Manager costs \$250,000 per server. The Web Interface for Enterprise Model Manager costs \$10,000. Packages made up of combinations of these elements are negotiable.

Education Services, provided through BusinessGenetics®, cost between \$5,000 and \$10,000 for Executive or Management Education Programs (depending on class size). xBML training costs from \$2,500 to \$7,500, depending on class size. Consulting services, provided through BusinessGenetics® are negotiable.

## **14. Company, Product Positioning, and Support**

### **14.1. Company Background Information**

xBML Innovations was founded in March of 2003 to develop software that not only adhered to the xBML Methodology, but provided a simple, yet robust, business facing solution. Through leveraging the more than 30+ years of software development expertise, 20+ years of applied research at Fortune 500 companies, and the daily experience of providing TRUE solutions through the xBML Methodology. xBML Innovations quickly gained support from the xBML community with its first client in May of 2003. Since that time, xBML Innovations has found a home in banking, government, investment, manufacturing, nuclear, entertainment, and telecommunications industries to name a few.

xBML Innovations, Inc. is a privately held corporation and part of the Affinity Solutions Holdings family of companies, in existence since 1998.

### **14.2. Positioning**

xBML Innovations was created to provide a Modeling Suite that would instantiate and enforce the xBML methodology. The xBML methodology is especially designed to support business managers and business analysts in the analysis and documentation to enterprise-wide business processes. It approaches the task by structuring the effort whereby managers and analysts define and document all of the elements of the business environment. Later, processes are defined with elements already in the repository. Unlike other tools that seek to support process redesign and software development, xBML Innovations has maintained a sharp focus on providing a business definition methodology. The elemental information gathered in an xBML model can be used in many other corporate initiatives. The xBML methodology has re-use methods to support over 30 corporate initiatives. As a consequence, where other tools can be too complex for business managers or require extensive training to understand all of the options or how to set up the tool to support some specific methodology or task, the xBML Modeling Suite is easy to learn because it is structured completely around a well-established business definition methodology.

### **14.3. Product Training**

xBML Innovations has a close relationship with BusinessGenetics®, a company that also supports the xBML Methodology and BusinessGenetics® provides an extensive education program for companies that want help or mentoring in using the methodology.

### **14.4. Business Process Consulting**

xBML Innovations has a close relationship with BusinessGenetics®, a company that also supports the xBML Methodology and BusinessGenetics® provides consulting for companies that want help or mentoring in using the methodology.

## **15. Case Study**

**Context.** In mid 2004, a major North East Pennsylvania utility which sells energy in key U.S. markets and delivers electricity to customers in Pennsylvania, the United Kingdom and Latin America, undertook a strategic initiative, at one of its nuclear energy generation plants, to reduce their nuclear refueling outage process from 45 plus days to 22, thus cutting the current outage cycle time by at least 50%. Approximately \$1 - \$3M per day can be realized for each day's reduction in the outage cycle, based on both cost reduction and revenue gain.

**The Challenge.** While the company had become very proficient at executing nuclear refueling outages, it was believed that an improved emphasis on planning and preparation activities would yield significant return. The goal of this engagement was to support the client in reducing the cycle time of a nuclear

refueling outage to 22 elapsed days. This would be accomplished by an explicit and detailed definition and agreement of the outage preparation process, using the proprietary BusinessGenetics® business modeling language - xBML.

In addition, the longer term strategic planning elements were not defined, which resulted in work being incorrectly scoped and resulted in unnecessary execution steps during the actual refueling outage.

The Solution. A program director and his team of colleagues were appointed as Subject Matter Experts (SMEs) to work with the BusinessGenetics® team to define and co-formulate the outage preparation process.

The team identified the business domains that they believed had the most potential to positively impact the overall goal of performing a nuclear refueling outage in 22 days. The eight Outage Preparation processes were: Strategy, Scoping, Emergent Work, Contingency Planning, Resourcing, Scheduling, Planning, and Access Processing. BusinessGenetics® and the client's team defined five project phases for this initiative.

Project Co-Formulation™ (PCF™) – BusinessGenetics® utilized xBML to define the project which resulted in a model of all of the necessary project activities, deliverables, responsibilities, resource estimates and timelines to achieve the project purpose. This project planning model was then automatically converted into Microsoft Project.

Document Co-Formulation™ – BusinessGenetics® xBML specialists used existing client documentation to co-formulate the initial set of xBML models (WHAT, WHICH, WHO, WHERE, WHEN and HOW). The DCF™ technique cut weeks out of the project effort and kept the SME interaction to an absolute minimum.

Hybrid (Current and Future) State Business Modeling – BusinessGenetics® xBML specialists facilitated work-sessions with client Subject Matter Experts (SMEs) to validate the xBML models and gather related issues, metrics, and “quick” wins. SMEs identified 383 current and 156 future business activities for the Outage Preparation process.

Opportunity Analysis – By analyzing the xBML models, business issues, and future state business processes; BusinessGenetics® xBML specialists produced a list of business improvement opportunities for the client. The client also visited two other nuclear energy providers to informally “benchmark” the defined outage preparation process.

Future State Business Modeling – Armed with this benchmark data and the xBML models, BusinessGenetics® facilitated work-sessions with client SMEs to develop the new vision for their nuclear refueling outage, by explicitly defining the “desired” state for Outage Preparation.

Develop and Execute Solutions – SMEs are subsequently implementing many business improvements in order to realize immediate ROI as well as consistent long term outage refueling ROI.

Subsequent steps of this project will entail leveraging the xBML desired state business models to auto-generate business requirements for IT, to support the automation of key areas of the business model.

The Result. Quick-win Result - Through the use of BusinessGenetics® xBML methodology, a range of between \$3M - \$5.5M was realized as immediate Return on Consultant Investment. This equates to approximately 2,350% – 4,370% return on the client's investment (NPV of 3 years).

Further, this Pennsylvania plant just executed their refueling outage (1<sup>st</sup> Quarter - 2005) in 25 days. This was a 20 day reduction of effort from the 45 day outage in 2004. This equates to a minimum savings of \$20M to \$60M from their 2004 outage. The client attests that a huge part of this success was made possible through the work that was done utilizing the BusinessGenetics® xBML methods, tools and consulting support.

Project Facts. The elapsed time of the xBML modeling effort was 38 days, and each SME contributed an average of 4 days to the effort. The client experienced the ability to accelerate and introduce rigor to the process itself, the process documentation and requirements definition. In addition, SMEs identified 221 desired state business requirements pertaining to Strategy and Planning. By implementing the newly defined business activities, the client was able to significantly reduce the nuclear refueling outage business operation costs and accelerate revenues.

## 16. Company Offices

Corporate offices for xBML Innovations are at:

9605 S. Kingston Court, Station 290,  
Englewood, CO 80112, USA.

Tel: 303 792 3086 Fax: 720 266 1030

Web: [www.xbmlinnovations.com](http://www.xbmlinnovations.com) Email: [info@xbmlinnovations.com](mailto:info@xbmlinnovations.com)

**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - I**

<b>1. Company, Product, Version</b>	<b>BOC GmbH ADONIS Ver. 3.8.1</b>	<b>CACI SIMPROCESS Ver. 4.2</b>	<b>Holocentric Holocentric Modeler Ver. 4.4</b>	<b>IDS Scheer ARIS Toolset Ver. 6.23</b>	<b>iGrafx iGrafx Ver. 10.0</b>
X = Vendor claims to have feature O = Vendor will add in next version					
<b>2. Product Architecture</b>					
<b>2.1 Architecture Overview</b>					
-Desktop	X	X	X	X	X
-Client Server	X	X	X	X	X
<b>2.2 Usability &amp; User Interface</b>					
-Business Users	X	X	X	X	X
-IT	X	X	X	X	X
-Web Deployment	X	X	X	X	X
<b>2.3 Repository Options/Team Dev.</b>					
-Team Design/Development	X	Limited	X	X	X
-Repository-based	X		X	X	X
-Version Control/Management	X	X	X	X	X
-File-based System					
-Uses 3 <sup>rd</sup> -Party CMS		X	X		
<b>2.4 Integration with Other Products</b>					
-XMI	X	X	X	X	X
-XML Import/Export	X	X	X	X	X
-BPEL	X		X	X	X
-COM			X	X	X
-VBA					X
-Text	X		X	X	X
-Visio	X		X	X	
-MS Office	X	X	X	X	X
-MS Visual Studio	X		X		
-IBM Rational Rose	X	X	X	X	
-ERwin				X	
-SCCI					
-Java RMI		X			
-SOAP	X	X			
-Xquery		X			
<b>3. Analysis &amp; Modeling</b>					
<b>3.1 Enterprise &amp; Org Models</b>					
<b>Enterprise Architecture Models</b>					
-Proprietary	X	X	X	X	X
-Zachman	X		X	X	X
-FEAF	X			X	X
-TOGAF	X			X	X
-Enterprise Architecture	X			X	X
-Information Engineering	X			X	X
-DODAF	X	X		X	X
-C4ISR	X			X	
-UML	X		X	X	
-Balanced Scorecard	X		X	X	X
-Rummler-Brache			X	X	X
-TEAF				X	X
-Customizable	X	X	X	X	X
<b>Organizational Models</b>					
-Organizational Modeling	X	X	X	X	X
-Relating Processes to Organizational Units	X	X	X	X	X
<b>Resource &amp; Cost Modeling</b>					
-Models Resource Categories	X	X	X	X	X
-Definition of Costs, Schedules, Usage Patterns	X	X	X	X	X



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X = Vendor claims to have feature O = Vendor will add in next version					
<b>Mapping Org Strategies to Performance</b>	X X	X X	X X	X X	X X
<b>Managing Process Portfolios</b> -Facilities Provided with Tool -Requires 3 <sup>rd</sup> -party CMS	X	X	X X	X	X
<b>3. Defining Processes</b> -Models Defined Graphically -Models Defined Textually	X X	X	X	X X	X
<b>Process Info storage &amp; Integrity</b> -Predefined Modeling Languages -Model/Process Integrity Facilities Provided	X X	X X	X X	X X	X X
<b>Graphical Notations</b> -Supports Wide Range of Notations -Proprietary -UML Activity Diagrams -UML 2.0 -BPMN -Customizable	X X X X X X	X X Partial Partial Partial X	X X X O X X	X X X X X X	X X X X X X
<b>3.3 Sub-Processes &amp; Activities</b> -Nesting of Sub-processes within Activities	X	X	X	X	X
<b>Defining Activities</b> -Ability to Associate Information with Activities	X	X	X	X	X
<b>Documenting Decision Rules</b> -Ability to Associate Rules with Activities	X	X	X	X	X
<b>Rules Entry</b> -Graphical Rule Editor -Text	X	X X	X X	X	X
<b>Activity Costs, Resources &amp; Time Data</b>	X	X	X	X	X
<b>3.4 Simulation</b> -Discrete Event	X	X	X	X	X
<b>Analytic Capabilities</b> -Definition of Multiple Business Case Scenarios -Animation -Exports to Spreadsheet Programs, etc.	X X X	X X X	X X X	X X X	X X X
<b>Real-Time Data Utilization</b>		X	X		X
<b>Model Distribute &amp; Simulation on Enterprise Networks</b>		X			
<b>Statistical Fit/Data Analysis</b> -Statistical Fit/Data Analysis Functionality Provided -Integrates with 3 <sup>rd</sup> -party Stat Tools	X X X	X X	X	Partial X	X X
<b>Capture &amp; Reporting of Simulated Metrics</b> -Generates Pre-defined Analytic Reports -Graphical Reports -User-defined Reports -Can Export Simulation Data	X X X X	X X X X	X X X X	X X X X	X X X X





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X = Vendor claims to have feature O = Vendor will add in next version					
<b>4. Business Process Methodologies</b>					
-Proprietary	X	X	X	X	X
-Balanced Scorecard	X		X	X	
-Value Chain/Stream	X		X	X	X
-Rummler-Brache			X		X
-Six Sigma	X		X	X	X
-Lean Six Sigma				X	X
-Lean Manufacturing					X
-ISO	X			X	X
-IDEFO	X			X	X
-Sarbanes-Oxley				X	X
-Customizable	X	X	X	X	X
	X				
<b>5. Report Generation &amp; Document Management</b>					
-Pre-built Reports	X	X	X	X	X
-HTML Publishing	X	X	X	X	X
-XML	X	X	X		X
-Graphical Model Interpreter				X	
-Import/Export (to MS Office, etc.)	X	X	X	X	X
<b>6. Development Environment</b>					
<b>6.1 Language of Tool</b>					
-C	X				
-C++	X		X	X	X
-Java	X	X		X	X
-VBX					
-C#			X		
-Smalltalk			X		
-Delphi					
<b>7. Software Modeling &amp; Code Generation</b>					
-Supports Software Modeling /Code Gen.	X	X	X	X	X
-Supports UML Model Generation	X	X	X	X	X
-Generates BPEL code	X		O	O	X
<b>8. Templates &amp; Frameworks</b>					
-Aerospace					
-BASEL II	X				
-CCOR					
-Chemicals				X	
-Enterprise Management			X		
-eTOM	X				
-DCOR					
-Defense				X	
-Education				X	
-Finance	X			X	
-Healthcare	X			X	
-Home Building	X			X	
-Insurance					
-ISO	X		X		
-ITIL	X		X	X	
-ITIM	X				
-Microsoft Axapta				X	



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X = Vendor claims to have feature O = Vendor will add in next version					
-Oracle				X	X
-Pharmaceuticals				X	
-Record Keeping (work process analysis)			X		
-Retail					
-Sarbanes-Oxley	X			X	
-SAP	X		X	X	
-Siebel					X
-Six Sigma	X		X	X	X
-SID/NGOS	X				
-SCOR	X	X	X	X	
-Telecom				X	
-VCOR					
<b>9. Systems Administration &amp; Security</b>					
-Role-based Access	X		X	X	X
-Version Control	X		X	X	X
-Web-based Adm. & Management	X			X	X
-Uses 3 <sup>rd</sup> -party Config. Mang. Tools		X	X		
<b>10. Scalability</b>					
-Supports Large, EA Modeling & BP Design & Reengineering Efforts	X	X	X	X	X
-Simulation of Complex Models/Inter-related Models	X	X	X	X	X
<b>11. Supported Platforms</b>					
-Windows	X	X	X	X	X
-Unix	(repository)			(repository)	(repository)
-Linux	(repository)	X			
<b>12. Pricing</b>					
-Starting (single seat)	\$2,500	\$9,995	\$1,550	\$2,500	\$395-\$1,895
<b>13. Company, Product Positioning &amp; Support Services</b>					
<b>13.1 Company Background</b>					
-Public		X		X	X
-Private	X		X		
<b>13.2 Positioning</b>					
-EA Modeling & Analysis	X	X	X	X	X
-Process Modeling & Analysis, Redesign, Improvement	X	X	X	X	X
-Detailed Process Modeling & Analysis (simulation)	X	X	X	X	X
-IT Support/Software Design & Development	X	X	X	X	X
-Human Performance Improvement	X	X	X	X	X
-Development of Management & Measurement Systems	X	X	X	X	X
<b>13.3 Support Services</b>					
-Product Training	X	X	X	X	X
-BP/EA Consulting	X	X	X	X	X

(End of Table I)



**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - II**

<b>1. Company, Product, Version</b>	<b>MEGA</b> MEGA Suite Ver. 6.1	<b>Popkin</b> <b>Software</b> System Architect Ver. 10	<b>Process</b> <b>Wizard</b> Process Wizard Ver. 7.0	<b>Proforma</b> <b>Corp.</b> ProVision Suite Ver. 4.4	<b>ProModel</b> <b>Solutions</b> Process Simulator Ver..4.0
X = Vendor claims to have feature O = Vendor will add in next version					
<b>2. Product Architecture</b>					
<b>2.1 Architecture Overview</b>					
-Desktop	X	X	X	X	X
-Client Server	X	X	X	X	X
<b>2.2 Usability &amp; User Interface</b>					
-Business Users	X	X	X	X	X
-IT	X	X	X	X	X
-Web Deployment	X			X	X
<b>2.3 Repository Options</b>					
-Team Design/Development	X	X	Limited	X	X
-Repository-based	X	X	X	X	X
-Version Control/Management	X	X	X	X	X
-File-based System			X		X
-Uses 3 <sup>rd</sup> -Party CMS					
<b>2.4 Integration with Other Products</b>					
-XMI	X	X		X	X
-XML Import/Export	X	X	O	X	
-BPEL	X	X		X	X
-COM	X	X	X	X	X
-VBA	X				X
-Text	X			X	
-Visio				X	X
-MS Office	X	X	X	X	X
-MS Visual Studio	X				
-IBM Rational Rose	X	X		X	
-ERwin				X	
-SCCI	X				
-Java RMI					
-SOAP					
-Xquery					
<b>3. Analysis &amp; Modeling</b>					
<b>3.1 Enterprise &amp; Org. Models</b>					
<b>Enterprise Architecture Models</b>					(Stencils)
-Proprietary	X	X	X	X	
-Zachman	X	X		X	
-FEAF		X		X	
-TOGAF		X		X	
-Enterprise Architecture	X	X		X	
-Information Engineering	X	X		X	
-DODAF	X	X		X	
-C4ISR		X		X	
-UML		X		X	
-Balanced Scorecard	X	X		X	
-Rummler-Brache	X	X		X	
-TEAF	X	X			
-Customizable	X	X	X	X	X
<b>Organizational Models</b>					
-Organizational Modeling	X	X	X	X	X
-Relating Processes to Organizational Units	X	X	X	X	X
<b>Resource &amp; Cost Modeling</b>					
-Models Resource Categories	X	X	X	X	X
-Definition of Costs, Schedules, Usage Patterns	X	X	X	X	X



**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - II**

<b>1. Company, Product, Version</b>	<b>MEGA MEGA Suite Ver. 6.1</b>	<b>Popkin Software System Architect Ver. 10</b>	<b>Process Wizard Process Wizard Ver. 7.0</b>	<b>Proforma Corp. ProVision Suite Ver. 4.4</b>	<b>ProModel Solutions Process Simulator Ver..4.0</b>
X = Vendor claims to have feature O = Vendor will add in next version					
<b>Mapping Org Strategies to Performance Measures</b>	X	X	X	X	X
<b>Managing Process Portfolios</b> -Facilities Provided with Tool -Requires 3 <sup>rd</sup> -party Config. Mang. Tool	X	X	X	X	(Visio)
<b>3.2 Defining Processes</b> -Models Defined Graphically -Models Defined Textually	X X	X X	X	X X	X
<b>Process Info Storage &amp; Integrity</b> -Predefined Modeling Languages -Model/Process Integrity Facilities Provided	X X	X X	X X	X X	X X
<b>Graphical Notations</b> -Supports Wide Range of Notations -Proprietary -UML Activity Diagrams -UML 2.0 -BPMN -Customizable	X X X X X X	X X X X X X	X X X O O X	X X X X Partial X	X X X X X X
<b>3.3 Subprocesses &amp; Activities</b> -Nesting of Sub-processes within Activities	X	X	X	X	X
<b>Defining Activities</b> -Ability to Associate Info with Activities	X	X	X	X	X
<b>Documenting Decision Rules</b> -Ability to Associate Rules with Activities	X	X	X	X	X
<b>Rules Entry</b> -Graphical Rule Editor -Text	X	X X	X	X	X
<b>Activity Costs, Resource, &amp; Time Data</b>	X	X	X	X	X
<b>3.4 Simulation Capabilities</b> -Discrete Event	X	X	O	X	X
<b>Analytic Capabilities</b> -Definition of Multiple Business Case Scenarios -Animation -Exports to Spreadsheet Programs, etc.	X X X	X X X	O	X X X	X X X
<b>Real-Time Data Utilization</b>	X	X		X	
<b>Model Distribution &amp; Simulations on Enterprise Networks</b>	X	X		X	X
<b>Statistical Fit/Data Analysis</b> -Statistical Fit/Data Analysis Functionality Provided -Integrates with 3 <sup>rd</sup> -party Stat Tools	X X	X X	O	X X	X X
<b>Capturing &amp; Reporting of Simulated Metrics</b> -Generates Pre-defined Analytic Reports -Graphical Reports -User-defined Reports -Can Export Simulation Data	X X X X	X X X X	O O O O	X X X X	X X X X



**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - II**

<b>1. Company, Product, Version</b>	<b>MEGA MEGA Suite Ver. 6.1</b>	<b>Popkin Software System Architect Ver. 10</b>	<b>Process Wizard Process Wizard Ver. 7.0</b>	<b>Proforma Corp. ProVision Suite Ver. 4.4</b>	<b>ProModel Solutions Process Simulator Ver..4.0</b>
X = Vendor claims to have feature O = Vendor will add in next version					
<b>4. Business Process Methodologies</b>					
-Proprietary	X	X	X	X	
-Balanced Scorecard	X	X	X		
-Value Chain/Stream			X		X
-Rummler-Brache				X	
-Six Sigma	X	X	X	X	
-Lean Six Sigma			X		
-Lean Manufacturing			X		
-ISO	X				
-IDEF0		X			
-Sarbanes-Oxley					
-Customizable	X	X	X	X	X
<b>5. Report Generation &amp; Document Management</b>					
-Pre-built Reports	X	X	X	X	X
-HTML Publishing	X	X	O	X	(Visio)
-XML	X	X	O	X	
-Graphical Model Interpreter		X		Yes	
-Import/Export (to MS Office, etc.)	X	X	X	X	X
<b>6. Development Environment</b>					
<b>6.1 Language of Tool</b>					
-C	X	X		X	
-C++	X	X	X	X	
-Java				X	
-VBX	X		X		X
-C#					
-Smalltalk					
-Delphi					
<b>7. Software Modeling &amp; Code Generation</b>					
-Supports Software Modeling & Code Gen.	X	X		X	
-Supports UML Model Generation	X	X		X	
-Generates BPEL code	X	X		X	
<b>8. Templates and Frameworks</b>					
-Aerospace			X		
-BASEL II	X				
-CCOR			X		
-Chemicals			X		
-Enterprise Management			X		
-eTOM		X			
-DCOR			X		
-Defense		X	X		
-Education				X	
-Finance					
-IDEF0		X			
-Insurance				X	
-ISO					
-ITIL	X			X	



**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - II**

<b>1. Company, Product, Version</b>	<b>MEGA MEGA Suite Ver. 6.1</b>	<b>Popkin Software System Architect Ver. 10</b>	<b>Process Wizard Process Wizard Ver. 7.0</b>	<b>Proforma Corp. ProVision Suite Ver. 4.4</b>	<b>ProModel Solutions Process Simulator Ver..4.0</b>
X = Vendor claims to have feature O = Vendor will add in next version					
-Oracle -Pharmaceuticals -Record Keeping (work process analysis) -Retail -Sarbanes-Oxley -SAP -Siebel -Six Sigma -SID/NGOS -SCOR -Telecom -VCOR	X	X	X	X	
<b>9. Systems Administration &amp; Security</b>					
-Role-based Access -Version Control -Web-based Administration & Mang. -Uses 3 <sup>rd</sup> -party Config. Mang. Tools	X X X	X X	O Limited	X X X	(Visio)  (Visio)
<b>10. Scalability</b>					
-Supports Large, EA Modeling & BP Design & Reengineering Efforts -Simulation of Complex Models/Inter-related Models	X X	X X	X	X X	 Partial
<b>11. Platforms Supported</b>					
-Windows -Unix -Linux	X (repository ) (repository )	X X	X	X	X
<b>12. Pricing</b>					
-Starting (single seat)	\$3,600	\$5,775	\$3,000	\$4,500	\$3,500
<b>13. Positioning</b>					
<b>13.1 Company Background</b>					
-Public -Private	X X	X	X	X	X
<b>13.2 Positioning</b>					
-EA Modeling & Analysis -Process Modeling & Analysis, Redesign, Improvement -Detailed Process Modeling & Analysis (simulation) -IT Support/Software Design & Development -Human Performance Improvement -Dev. of Mang. & Measure Systems	X X X X X X	X	X X	X X X X X	X  X  X
<b>13.3 Support Services</b>					
-Product Training -BP/EA Consulting	X X	X X	X X	X X	X X

(End of Table II)





**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - III**

<p><b>1. Company, Product, Version</b></p> <p>X = Vendor claims to have feature O = Vendor will add in next version</p>	<p>xBML Innovations xBML Modeling Suite</p>				
<b>2. Product Architecture</b>					
<b>2.1 Architecture Overview</b>					
-Desktop	X				
-Client Server	X				
<b>2.2 Usability &amp; User Interface</b>					
-Business Users	X				
-IT	X				
-Web Deployment					
<b>2.3 Repository Options/Team Dev.</b>					
-Team Design/Development	X				
-Repository-based	X				
-Version Control/Management	X				
-File-based System	X				
-Uses 3 <sup>rd</sup> -Party CMS	X				
<b>2.4 Integration with Other Products</b>					
-XMI	X				
-XML Import/Export	X				
-BPEL	X				
-COM					
-VBA					
-Text	X				
-Visio	X				
-MS Office	X				
-MS Visual Studio					
-IBM Rational Rose	X				
-ERwin					
-SCCI	X				
-Java RMI					
-SOAP	X				
-Xquery	X				
<b>3. Analysis &amp; Modeling</b>					
<b>3.1 Enterprise &amp; Org Models</b>					
Enterprise Architecture Models					
-Proprietary	X				
-Zachman					
-FEAF	X				
-TOGAF	X				
-Enterprise Architecture	X				
-Information Engineering	X				
-DODAF	X				
-C4ISR	X				
-UML	X				
-Balanced Scorecard	X				
-Rummler-Brache	X				
-TEAF					
-Customizable					
<b>Organizational Models</b>					
-Organizational Modeling	X				
-Relating Processes to Organizational Units	X				



**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - III**

<b>1. Company, Product, Version</b>	<b>xBML Innovations</b> xBML Modeling Suite				
X = Vendor claims to have feature O = Vendor will add in next version					
<b>Resource &amp; Cost Modeling</b> -Models Resource Categories -Definition of Costs, Schedules, Usage Patterns	X X				
<b>Mapping Org Strategies to Performance Measures</b>	X				
<b>Managing Process Portfolios</b> -Facilities Provided with Tool -Requires 3 <sup>rd</sup> -party CMS	X				
<b>3. Defining Processes</b> -Models Defined Graphically -Models Defined Textually	X				
<b>Process Info storage &amp; Integrity</b> -Predefined Modeling Languages -Model/Process Integrity Facilities Provided	X X				
<b>Graphical Notations</b> -Supports Wide Range of Notations -Proprietary -UML Activity Diagrams -UML 2.0 -BPMN -Customizable	X   X				
<b>3.3 Sub-Processes &amp; Activities</b> -Nesting of Sub-processes within Activities	X				
<b>Defining Activities</b> -Ability to Associate Information with Activities	X				
<b>Documenting Decision Rules</b> -Ability to Associate Rules with Activities	X				
<b>Rules Entry</b> -Graphical Rule Editor -Text	X				
<b>Activity Costs, Resources &amp; Time Data</b>	X				
<b>3.4 Simulation</b> -Discrete Event	X				
<b>Analytic Capabilities</b> -Definition of Multiple Business Case Scenarios -Animation -Exports to Spreadsheet Programs, etc.	X X X				
<b>Real-Time Data Utilization</b>	X				
<b>Model Distribute &amp; Simulation on Enterprise Networks</b>					
<b>Statistical Fit/Data Analysis</b> -Statistical Fit/Data Analysis Functionality Provided -Integrates with 3 <sup>rd</sup> -party Stat Tools	X  X				



**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - III**

<b>1. Company, Product, Version</b> X = Vendor claims to have feature O = Vendor will add in next version	xBML Innovations xBML Modeling Suite				
<b>Capture &amp; Reporting of Simulated Metrics</b> -Generates Pre-defined Analytic Reports -Graphical Reports -User-defined Reports -Can Export Simulation Data	X X X X				
<b>4. Business Process Methodologies</b> -Proprietary -Balanced Scorecard -Value Chain/Stream -Rummler-Brache -Six Sigma -Lean Six Sigma -Lean Manufacturing -LOVEM -ISO -IDEF0 -Sarbanes-Oxley -Customizable	X  X X X  X X X				
<b>5. Report Generation &amp; Document Management</b> -Pre-built Reports -HTML Publishing -XML -Graphical Model Interpreter -Import/Export (to MS Office, etc.)	X X X X X				
<b>6. Development Environment</b> <b>6.1 Language of Tool</b> -C -C++ -Java -VBX -C# -Smalltalk -Delphi	    X  				
<b>7. Software Modeling &amp; Code Generation</b> -Supports Software Modeling /Code Gen. -Supports UML Model Generation -Generates BPEL code	  O				
<b>8. Templates &amp; Frameworks</b>					





**BPTrends 2005 EA, Modeling, & Simulation Tools Matrix - III**

<p><b>1. Company, Product, Version</b></p> <p>X = Vendor claims to have feature O = Vendor will add in next version</p>	<p>xBML Innovations xBML Modeling Suite</p>				
<p><b>13.2 Positioning</b></p> <p>-EA Modeling &amp; Analysis -Process Modeling &amp; Analysis, Redesign, Improvement -Detailed Process Modeling &amp; Analysis (simulation) -IT Support/Software Design &amp; Development -Human Performance Improvement -Development of Management &amp; Measurement Systems</p>	<p>X X X X X</p>				
<p><b>13.3 Support Services</b></p> <p>-Product Training -BP/EA Consulting</p>	<p>X X</p>				

(End of Table III)



## Authors

### Curt Hall



Curt Hall is a well-known industry analyst, consultant, and newsletter editor. Curt's expertise includes business process management, business intelligence, data warehousing, business performance management, data mining, business rules engines, knowledge management and other analytic technologies. He also focuses on the commercial applications of intelligent software including rule-based systems, intelligent agents, and speech recognition.

In addition to working as an analyst for *BPTrends*, Curt is a senior consultant with Cutter Consortium's Business Intelligence Advisory service, where he serves as editor of the weekly *Business Intelligence Advisor* e-newsletter. He is also co-author (with Paul Harmon) of *Intelligent Software Systems Development: An IS Manager's Guide* (John Wiley & Sons) and a contributing author to James Martin and James Odell's *Object-Oriented Methods: Pragmatic Considerations* (Prentice Hall). Curt's work has appeared in numerous technical journals and IT publications. His study on the corporate use of data warehouses and the issues associated with data warehousing projects has resulted in the in-depth report *Corporate Use of Data Warehousing & Enterprise Analytic Technologies*.

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### Paul Harmon



Paul Harmon is the Executive Editor and Founder of the Business Process Trends website.

Paul is a noted consultant, author, and analyst concerned with applying new technologies to real-world business problems. Paul's most recent book is *Business Process Change: A Manager's Guide to Improving, Redesigning, and Automating Processes* (Morgan Kaufmann, 2003). He has written a wide variety of articles that have been published on BPTrends in the past two years.

Paul has worked on major process redesign projects with Bank of America, Wells Fargo, Security Pacific, Prudential, and Citibank, among others. Paul is a widely respected keynote speaker and has developed and delivered workshops and seminars on a wide variety of topics to conferences and major corporations through out the world.

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